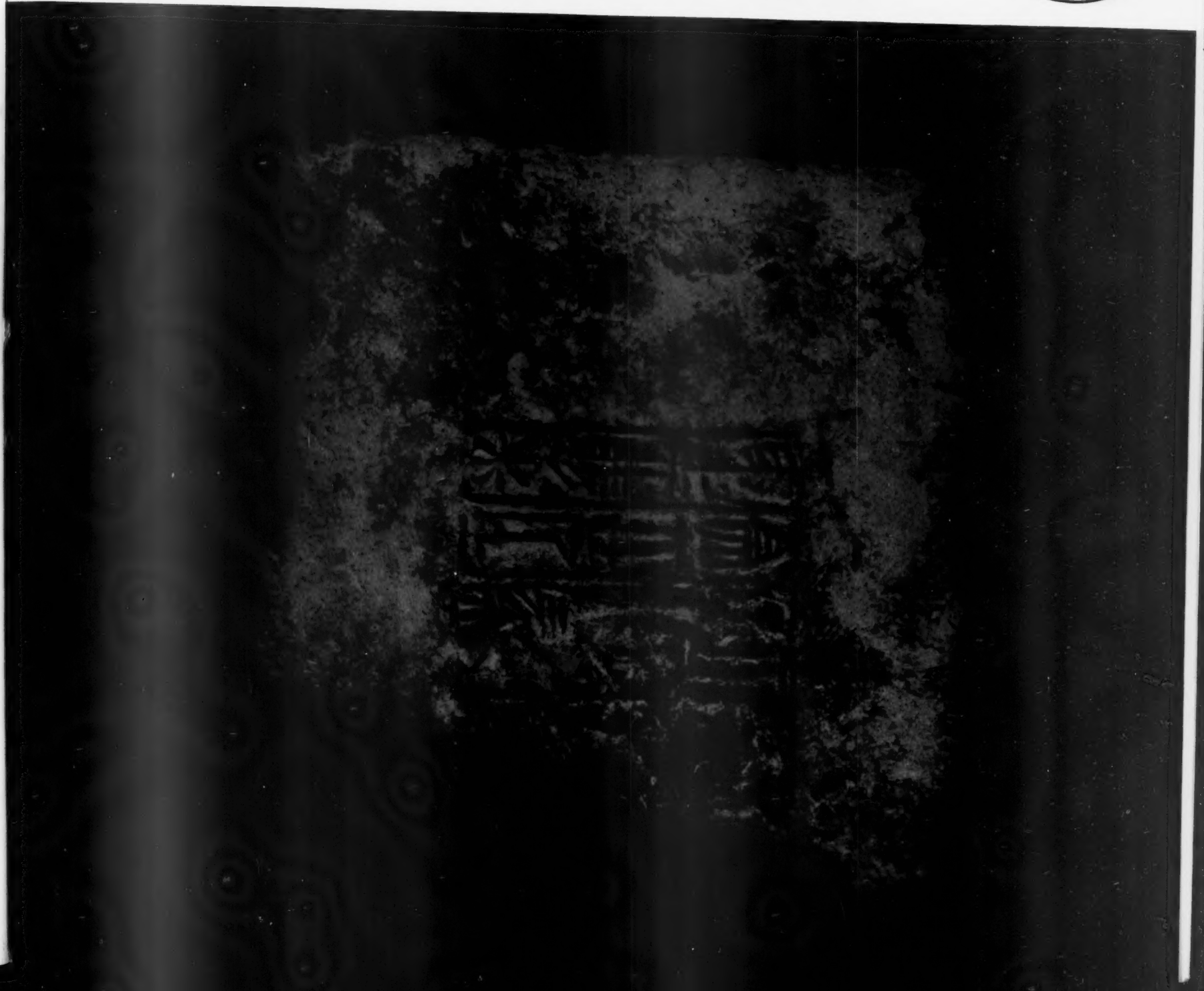
AUGUST 1960 VOLUME 2 NUMBER 8

architectural & engineering NEWS



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Photos courtesy of Dinnerhorn Restaurant, Covina, California

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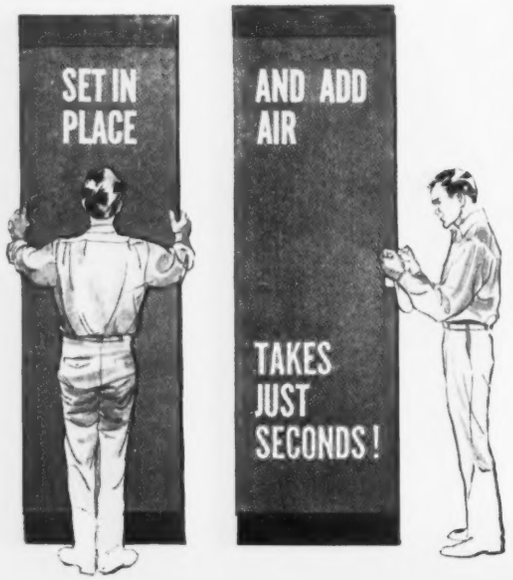

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BPA

architectural & engineering
NEWS

This issue places emphasis on the ceramic, glass and masonry materials of architecture. It is given symbolic treatment by Tony Palladino in his graphic use of the 5,000 year-old molded flat brick from the ancient Mesopotamian city of Ur which was presented to The American Institute of Architects by the Structural Clay Products Institute in observance of SCPI's 25th anniversary. The molded flat brick came from the ancient city of Ur in Chaldea in what is now Iraq.

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GAZETTE

John Louis Wilson, AIA, was re-elected president of the Council for the Advancement of the Negro in Architecture. Newly elected to the Board of Trustees are: Prof. Howard H. Mackey, AIA; Richard C. White, RA; Victor D. Gruen, AIA; Louis Edwin Fry, AIA; and Henry Steinhardt, AIA. Others on the Board include: Thomas H. Creighton, FAIA; Hilyard R. Robinson, AIA; Richard Roth, AIA; Simon Breines, AIA; Henry Wright; and Percy Ifill.

The Southern California Chapter, AIA, announces the election of seven new corporate members: Thomas W. Cowie, Sherman Oaks; Harry W. Ganstrom, West Los Angeles; Frank Homolka, Long Beach; Robert Jun Lee, Los Angeles; Charles T. Rafferty, Ontario; Orville D. Sink, Arcadia; and Clyde L. Whitlow, Los Angeles.

Glenn W. Holcomb, chairman of the Department of Civil Engineering at Oregon State College, Corvallis, has been named the official nominee for President of the American Society of Civil Engineers for the year 1960-1961.

John Ross, former deputy representative of the United States on the U.N. Security Council with the rank of Minister, was appointed Executive Secretary of the Committee on Design of the New York World's Fair 1964-1965 Corporation.

Barry Moffit, fifth-year graduate of the University of Southern California's School of Architecture, was awarded 1959-1960 Welton Becket and Associates Fellowship in Architecture.

Adolph Klein has retired as Coordinator for Commission Matters of the New York Department of City Planning, a post he has held since 1956.

Joseph A. Rosenthal, PE. President of Engineers, Inc. of Newark, has been named Alternate National Director of the N.J. Society of Professional Engineers.

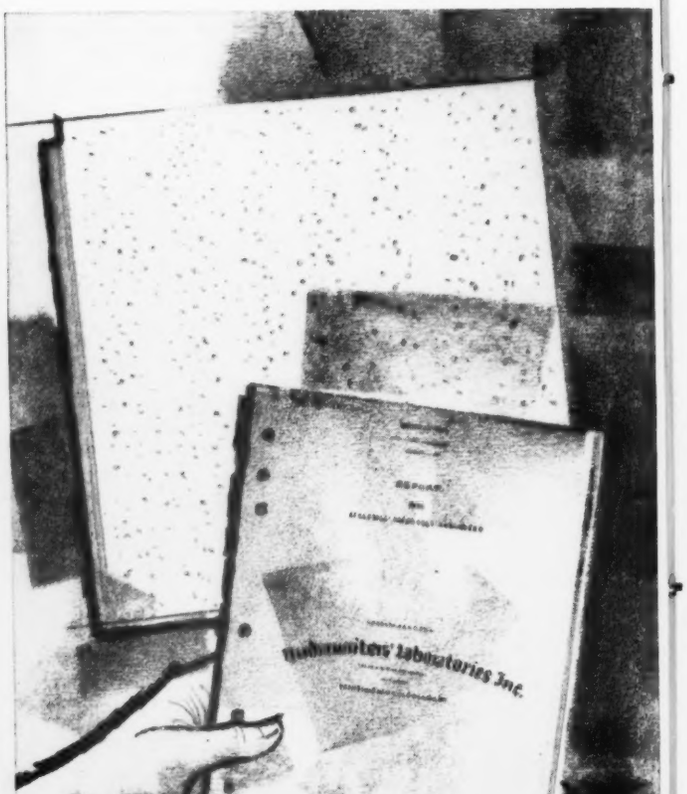
Robert Trask Cox, AIA, has been appointed to the board of directors of the Southern California Chapter, AIA. Cox fills the vacancy created by the resignation of Arthur B. Gallion, former Dean of the School of Architecture University of Southern California, who has become director of planning for the firm of Harland Bartholomew & Associates, city planners and engineers of Honolulu.

Henry Charles Burge, AIA, has been appointed Acting Dean of the University of Southern California School of Architecture. He also serves as the chairman of the faculty committee to assist in the selection of a new Dean.

Donald S. Haarstick, AIA, appointed to three year term on City of St. Paul Planning Board.

How to save construction time with

Acoustical Fire Guard, a remarkable new construction time—and it gives Under



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GAZETTE

Frederick J. Woodbridge, partner in Adams and Woodbridge, has been elected president of the New York Chapter, AIA. Other officers are: David L. Eggers, vice president; Peter S. Van Bloem, secretary; and Michael M. Harris, treasurer.

Harry C. Plummer, Director of Engineering & Technology for the Structural Clay Products Institute, was honored with the Award of Merit of American Society of Testing Materials. He received the award in recognition of long-time constructve participation in the work of ASTM building materials committees and for promoting the use of ASTM standards by architects and engineers.

Harold L. Humes is now serving his second term as president of the Building Research Institute and Robert W. Cutler, FAIA, his second term as vice president. Newly elected vice presidents are: Graham J. Morgan and Peter B. Gordon.

Office announcements

M. Mack Earle has resigned as Chief Naval Architect of the Maryland Shipbuilding and Drydock Co. and has entered private practice as a Consulting Naval Architect at 1602 Timbercrest Drive, Baltimore 2, Maryland.

The firm of Carl W. Pirscher and Associates, Architects, AIA, 23255 Woodward Ave., Ferndale, Mich., is being joined by William R. Jarratt, AIA. The new organization will be known as Pirscher and Jarratt, Architects.

Samborn, Steketee, Otis and Evans, engineers and architects, to Libbey-Owens-Ford Building, Toledo, Ohio.

George M. D. Lewis, RA, has added a new partner, Donaldson Berghauser, RA. The firm will now be known as Lewis & Berghauser, Registered Architects.

A new architectural firm, Merrill, Roehrig, Onodera & Kinder, Inc., has begun operations in the Damon Building, Honolulu, Hawaii.

J. Frederick Cook Jr., and Joseph M. Leonte, AIA announce the formation of a partnership for the practice of architecture at 57 Hazelwood Ave., Livingston, N.J.

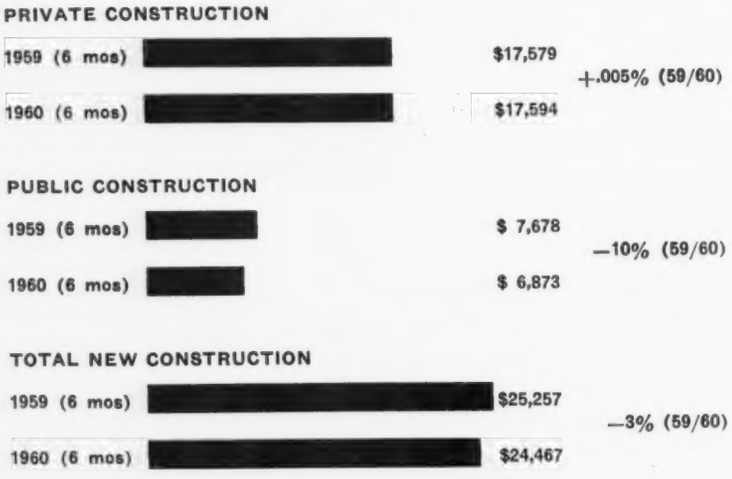
Bill Akerman, Specifier, announces the opening of his office for the preparation of specifications for architects at 12741 Hatteras St., North Hollywood, Calif.

Magney, Setter, Leach & Lindstorm, Inc., is the new corporate name for the architectural and engineering firm of Minneapolis.

McCreary-Koretsky, San Francisco, Sacramento, & Seattle, is the new consulting engineering firm created when Porter, Urquart, McCreary & O'Brien (PUMO) dissolved due to the death of Colonel Leonard C. Urquart.

FORECAST

NEW CONSTRUCTION PUT IN PLACE IN
CONTINENTAL UNITED STATES
FIRST SIX MONTHS OF 1960 COMPARED WITH 1959*



* COMPARISONS GIVEN IN MILLIONS—CONSTRUCTION ACTIVITY REPORTS OF U.S. DEPARTMENT OF COMMERCE, WASHINGTON, D.C.

CONSTRUCTION OUTLOOK FIRST SIX MONTHS 1960*

The value of new construction put-in-place in June 1960 amounted to $4.9 billion, according to preliminary estimates of the Bureau of the Census, U.S. Department of Commerce. This was 7 per cent above the May 1960 level, a smaller increase than is normal between May and June, and 5 per cent less than in June 1959. The cumulative value of construction expenditures in the first six months of 1960 amounted to $24.5 billion, 3 per cent below the comparable 1959 total.

The seasonally adjusted annual rate of total new construction expenditures in June 1960 was $53.4 billion, about one per cent under the May 1960 rate. Public construction expenditures, which declined from an annual rate of $15.8 billion in May to $15.4 billion in June, accounted for the major portion of this decline.

Private construction

Total new private construction expenditures in June 1960 amounted to $3.4 billion, 7 per cent above the May 1960 level but 4 per cent less than in June 1959. Private residential construction expenditures in June 1960 increased 9 per cent from the May 1960 level. This increase was slightly more than the usual seasonal rise, and therefore, the seasonally adjusted annual rate increased from $21.0 to $21.1 billion. Residential expendiutres in June 1960 were 9 per cent less than in June 1959. Expenditures for nearly all other categories of private construction were higher in June 1960 than in June 1959.

Total new private construction expenditures in the first six months of 1960 amounted to $17.6 billion, about the same as the total for the first half of 1959. The cumulative value of private residential construction in the first six months of 1960 was $9.6 billion, 7 per cent less than in the comparable period of 1959. For all the remaining categories of private construction, except farm construction, cumulative expenditures in the first six months of 1960 were ahead, most of them substantially ahead, of their comparable 1959 totals.

Work was started on 128,300 housing units in May 1960, according to preliminary estimates of the Bureau of the Census, in comparison with the 156,000 units started in May 1959. Privately owned housing starts totaled 125,700 units, representing a seasonally adjusted annual rate of 1,322,000 virtually unchanged from the estimated annual rate of 1,324,000 in April, but still 17 per cent below the May 1959 seasonally adjusted annual rate of 1,597,000.

Public construction

New public construction expenditures in June 1960 amounted to $1.5 billion, 9 per cent above the May 1960 level but 9 per cent less than in June 1959. The May to June increase was less than normal for this period. The May to June increases in expenditures for non-residential buildings and for military facilities were substantially less than normal and accounted for most of the decline in the seasonally adjusted annual rate of public construction. The cumulative value of expenditures for public construction in the first six months of 1960 amounted to $6.9 billion, 10 per cent less than in the same period of 1959.

Patterns and factors

Except when special surveys are undertaken, as was done during the 1959 steel strike to obtain some information about the effect of steel shortages on construction work done, these monthly estimates are not based on direct measurements. Primarily, they are derived by applying standard progress patterns (which reflect normal seasonal movements) to the value of contracts awarded prior to the current month. However, in the case of new private dwelling units, patterns are applied to the estimated value of housing starts through the current month. The estimates do not reflect the effects of the varying number of working days each month, nor of special conditions influencing the volume of activity in any given month, such as unusual weather, overtime, postponements, and except when special surveys are made, materials shortages and work stoppages.

**Based on "Construction Reports," U.S. Department of Commerce, Washington, D.C.*

AIA portfolio

The American Institute of Architects reports that a comprehensive study of how the architectural profession can contribute more effectively to the improvement of the quality and design of residential environment is being conducted by a special committee of inquiry by the *Royal Architectural Institute of Canada.* The Canadians are anticipating that their cities will double in less than a generation. To meet the problems of their urbanization, the RAIC undertook to evaluate the post-war urban development in Canada in order to develop a system of criteria for creating an optimum urban environment. The Canadian experience should prove to be of value to American architects. In its report, the RAIC committee aims its chief criticism of the urban environment at the "sameness and mediocrity" of new housing developments and their deficiency in adequately meeting individual family requirements.

Models and plans for the Southwest Washington (D.C.) waterfront redevelopment are on display throughout the month of August at the Gallery of The American Institute of Architects in the Octagon House, in Washington, D.C.

The new plans and buildings for the waterfront, along the Potomac southwest of the Capitol, are to bring a new atmosphere to this, the city's most interesting and controversial section. The old fish market and sea food restaurants in the area are now being demolished and new construction along Maine Ave. is already under way.

The Octagon exhibit includes the accepted designs for new projects as well as architectural student work proposing the re-planning of the southwest waterfront area.

Among the new projects are plans and models for the new Arena Theater by architect Harry Weese, AIA, of Chicago, Ill.; Hogate's Restaurant, a National Planetarium and the National Historical Wax Museum, to be known as Channel Square, by architect Paul Rudolph, AIA, of Sarasota, Fla.; and the Flagship Restaurant and the designs for Harbor Square by architects Satterlee & Smith of Washington, D.C.

The student projects were developed in the Department of Architecture of Catholic University.

Research and standards

The *Mellon Institute* of Pittsburgh, Pa., continued its planned expansion of fundamental research last year in the midst of a huge national applied research and development program. The Institute's Annual Report for 1959-60, just released, reveals that the basic research staff now numbers 77, an increase of 21 during the fiscal year.

A considerable increase in the number of government agencies supporting fundamental research at the Institute was also reported. Research by the Institute is conducted in a number of technical fields. The Institute scientists published 12 books in 1959, ten more than in the previous year. In addition, 32 U.S. patents were obtained by applied research groups, an increase of 14 over the preceding year.

Dimensional standards for all major categories of building materials will soon be placed under intensive study by appointed representatives of associations and societies involved in building industry activities.

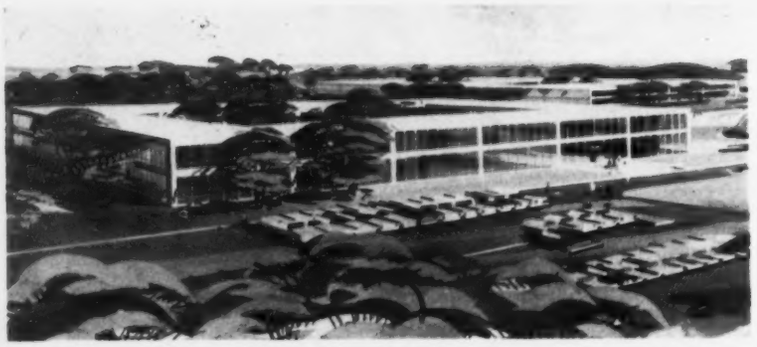
The occasion is a forthcoming meeting of Sectional Committee A62 of the *American Standards Assn.* on the Coordination of Dimensions of Building Materials and Equipment. Secretarial activities for the committee are a function of the recently formed *Modular Building Standards Assn.*, a non-profit organization initiated and sponsored by *The American Institute of Architects, Producers' Council, National Assn. of Home Builders,* and the *Associated General Contractors of America* for purposes of technical, educational and standards activities connected with the furtherance of modular practices in the construction industry.

The setting of standards for sound-insulating doors is the first objective of a new association, *The Acoustical Door Institute* at a Chicago meeting of acoustical door manufacturers. The standards are expected to be invaluable for both users and makers of these doors.

At its founding meeting, the mem-

(Continued on page 6)

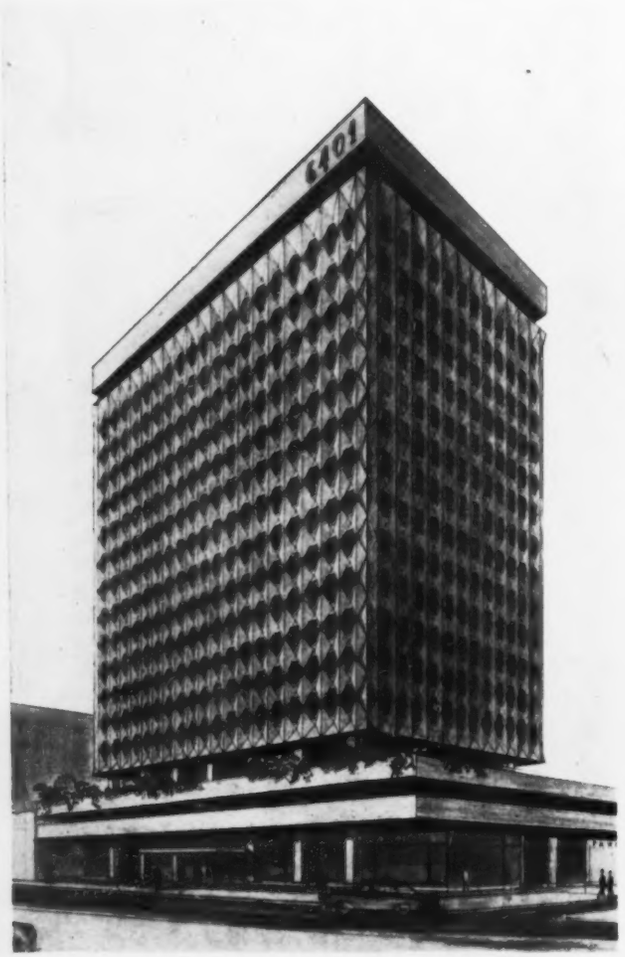
Five arching towers symbolizing man's continuing quest for knowledge of the universe will highlight U.S. Science Pavilion (ABOVE) at the Century 21 International Exposition in Seattle in 1962. Shown here is model of the building. Part of the $9 million program of federal participation in Century 21, the $3.5 million pavilion was designed by Architects Minoru Yamasaki and Associates of Detroit and Naramore, Bain, Brady and Johanson of Seattle. Sheathed in stainless steel and glass, the United Engineering Center (LEFT), $12 million, 20-story structure scheduled to rise opposite the United Nations Building in New York, will be occupied in mid-1961, by 18 American engineering organizations with a combined membership of 300,000. Architects: Shreve, Lamb and Harmon Associates, New York City.



United Air Lines recently-announced Education and Training Center to train annually 2,000 management employees and stewardesses will be built near Chicago's O'Hare Field at approximate cost of $2 million on part of a 51-acre site. Reinforced concrete structure will have glass skin set in extruded aluminum. The 85,214 sq. ft. floor area will contain administrative offices, conference rooms, classrooms, dormitory suites, a kitchen and cafeteria. Year-round recreational facilities including a swimming pool, will also be provided. Architects: **Skidmore, Owings & Merrill.**

A|E NEWS

(Continued from page 5)



Rendering of completed preliminary plan for a new $7 million 15-story office building for Wilshire Blvd. in Los Angeles. Plans call for 220,000 sq. ft. of office space, a bank at the ground floor, a terrace restaurant on the second floor and sub-level parking for 400 cars. Architects: Steven M. Heller, AIA, San Francisco, and Rochlin and Baran AIA, and Associates, Architects and Engineers, Los Angeles.

First of twin towers for Jackson, Michigan is a 70-unit, 8-story apartment complex. Structure is a mono-slab concrete frame clad in contrasting quartz panels, floor-to-ceiling windows. Continuous vertically-accentuated precast panels act as an exterior closure for heating and cooling risers. Architects: King & Lewis, Inc., of Detroit with Wah Yee, Chief Designer and Berj Tashjian, Project Architect.

Architect's rendering of proposed Vonway Shopping Center, Odessa, Texas, to be completed in August, 1961. Center will contain 250,000 square feet of rental area, in addition to parking space for a minimum of 2,000 cars. Cost is estimated at approximately $3 million. Architect: Wilson, Morris, Crain & Anderson, AIA, Houston, Texas.

bership instructed its officers to select or establish a suitable laboratory where sound insulating doors, manufactured by Institute members, may be tested in accordance with official Institute standards. The officers were charged with the preparation, at the earliest practicable time, of standardized testing procedures.

Technical assistance to underdeveloped countries, in the form of ASTM standards, would provide a wealth of information on materials not available in any other form, and would be a sure way to put international trade in materials on a sound base. These points were made by F. L. LaQue, retiring president of the *American Society for Testing Materials,* during the 63rd Annual Meeting of ASTM, in Atlantic City, N.J.

In outlining the already international scope of ASTM, Mr. LaQue, who is Vice-President for Development and Research of The International Nickel Co., New York, cited as evidence the facts that the Society now has members in more than 50 foreign countries; that in 1959 it received more than 9,000 orders for publications from more than 65 foreign countries, from Afghanistan to the Windward Island; that for some time it has been making substantial contributions to the work of the International Standards Organization, through the American Standards Assn.

CEC/ASCE/NSPE news

A manual of recommended principles for consulting engineers has just been published by the *Consulting Engineers Council,* Springfield, Ill., for use by its member firms.

Titled "The Practice of Consulting Engineering," the manual assembles in one volume a series of practical guides to the mechanics and performance necessary in conducting a successful consulting engineering practice. It also is designed for use by engineering students, manufacturers and clients. The manual covers 95 specific aspects of practice in its 200 pages.

The National Society of Professional Engineers reports that Rep. John R. Foley, (Md.), has introduced a bill to regulate the practice of engineering on Federal projects or projects sponsored by the Federal Government through the establishment of a system for the Federal registration

of professional engineers, scientists and technicians. The bill provides that no person can engage in the practice of engineering, scientific pursuit or technical endeavor on Federal projects or Federal sponsored projects unless he submits evidence of qualification and becomes registered under the proposed act.

A Federal Board of Registration for Federal Professional Engineers, Scientists and Technicians would be created to administer the program. The Board would consist of several members who have been engaged in the practice of engineering for twelve or more years, and who, for the past three years, have been employed by the Government. Appointments to the Board would be made by the executive branch of the Government from a list of eligibles submitted by the Congress.

In an effort to assure the continuation of negotiation procedures for the procurement of professional engineering services by military agencies, the *National Society of Professional Engineers* has urged a House Armed Services Subcommittee to amend certain features of a pending bill designed to increase the use of formal advertising and competitive bidding. The procurement of professional services is presently exempted from formal advertising requirements of the Armed Forces Procurement Act, but proposed changes to existing law, NSPE pointed out, could detract from qualification as the primary consideration in the awarding of a contract for such services. The NSPE views the language of the pending bill as permitting some element of competition based on price to be taken into consideration during contracting procedures for professional services.

The president of the *American Society of Civil Engineers* called upon its 45,000 members to set a "truly professional" example in dispelling "a growing disregard for honesty and fair dealing in business relations."

President Frank A. Marston, of Boston, said in his annual address at the convention of the engineers that the civil engineer must not only be competent in his technique, but his behavior must conform to the general requirements for professional behavior which have been developed over the years by the learned professions.

"Today," said Mr. Marston, "there appears to be a growing disregard for honesty and fair dealing in busi-

(Continued on page 8)

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A|E NEWS

(Continued from page 7)

ness relations, in TV shows, in some labor union managements, in competition for engineering projects, and in other phases of everyday life."

"This is to be regretted greatly if it applies to a member of the engineering profession," he added.

Referring to the ethical behavior of engineers, he said that members of the Society and cause a greater impact sisting of ten articles, all of which, when followed more, will strengthen the Society and cause a greater im- of the Society on national affairs.

Mid-west roundup

Chicago's *Michigan Boulevard Assn.* is forming an organization to work with the Park District for improvement of Grant and Burnham Parks. This action followed presentation of the Chicago Central Area Committee's program for improving the parks at the annual meeting of the Assn. In seeking a continuing development of the park area, other Chicago organizations representing tennis, figure-skating, music and art enthusiasts will work with the Michigan Boulevard group on park improvement.

The new Chicago plant of the Owens-Illinois Paper Products Division has received a citation of merit for excellence in architecture among Chicago area buildings construction in the past five years.

Completed in mid-1959, the plant officially opened last October to supply boxes to Chicago area industries.

The citation, one of a number presented to Chicago area schools, churches, home owners and industries, was presented to Leonard T. Moore, plant general manager, jointly by the Chicago Chapter of The American Institute of Architects and the Chicago Assn. of Commerce and Industry. Architect was *Skidmore, Owings & Merrill* and general contractor was Luria Engineering Co.

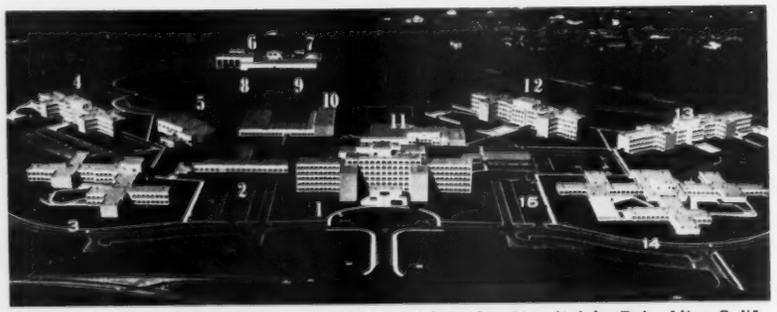
Albert Kahn Associated Architects and Engineers, Inc., Detroit, have been notified that the new automobile assembly plant, designed for the Chrysler Corporation and built at Fenton, Mo., near St. Louis, has been named one of the nation's "Top Ten Plants of the Year." The plant was selected from over 500 entries in this competition.

A new 5,000 square foot structure, costing $190,000, for laboratory animals is being built by Baxter Laboratories, Inc., at 6301 North Lincoln, Morton Grove, Ill. The new scientific facility, an addition to the company's pharmacologic and toxicologic facilities, was designed by *Friedman, Alschuler & Sincere*, architects and engineers of Chicago, Ill.

Construction is underway on the $13.5 million California Bank Building in Beverly Hills, Calif. Reinforced concrete structure, with an exterior skin of marble and glass will have 600,000 sq. ft. in eight-stories plus mezzanine, penthouse and five sub-levels. Parking provided for 1,100 cars. Architect: Charles Luckman Associates, Los Angeles.

Rendering shows proposed building group for Breezy Point, a privately financed community to accommodate a population of 220,000, on western portion of Rockaway Peninsula in Queens County, N. Y. To be completed between 1970 and 1972, at estimated cost of $1.25 billion, development is intended for middle income housing. Architects and Engineers: Brodsky, Hopf & Adler, New York, N. Y.

Construction has begun on 4-story, $550,000 brick office building to be known as 160 Halsted St. Building in East Orange, N. J. A simulated "stilt" design is utilized which features four marble columns with a 3-ft. setback for the first floor. Engineers, Inc. of Newark, N. J. has provided the consulting engineering and design services.



Just completed, the $20 million Veterans Administration Hospital in Palo Alto, Calif., provides a neuropsychiatric facility in a 15-building, 1,000 bed campus like complex. As numbered above, the buildings are (1) General Medical and Surgical and Administration (2) Medical Rehabilitation (3) infirm (4) disturbed (5) therapeutic exercise clinic (6) garage (7) utility shops (8) boiler house (9) laundry (10) special services (11) kitchen and dining hall (12) admission and treatment (13) women's (14) neurological and (15) chapel. Architects-Engineers: Welton Becket and Associates, Los Angeles.

West coast report

Welton Becket & Associates, Architects and Engineers, report several projects underway: the master-planning of the campus construction at the University of California at Los Angeles, a 1,500-car garage facility beneath historic Boston Common, a new $11 million hotel for Melbourne, Australia, and the design of UCLA's first parking structure, a hillside unit to accommodate 891 automobiles on a self-parking basis.

Hopes that Bolton Hall, former Tujunga city hall, will be preserved as a California landmark have been spurred by a recent visit of California state officials to the historic site. Prior to the inspection trip of the state delegation, Tujunga citizen groups had requested support from the *Southern California Chapter of the AIA* to determine the significance of the historic building. *William Woollett, AIA*, a recognized authority in this field and chairman of the Southern California's AIA chapter's Preservation of Historic Buildings committee, recommended that the former city hall be maintained as a state monument. The support of the American Institute of Architects is part of a continuing program to preserve historic buildings as a means of conveying to present and future generations the way of life which shaped the cultural heritage of this area.

A building permit was issued by the City of Los Angeles today for the tallest apartment project in the West, Barrington Plaza, considered a massive and dramatic development to be built on Wilshire Blvd., in West Los Angeles. Barrington Plaza is the tallest building, largest in floor area and largest in valuation for a privately owned project in the city's history. The $18 million project will provide three apartment buildings, one of which will be 26 stories high and two will be 17 stories high; a fourth building, a two-story commercial and office building will complete the 5-acre complex. A two-level subgrade garage will house 814 tenant autos. Architect and engineers for the project are *Daniel, Mann, Johnson and Mendenhall* of Los Angeles.

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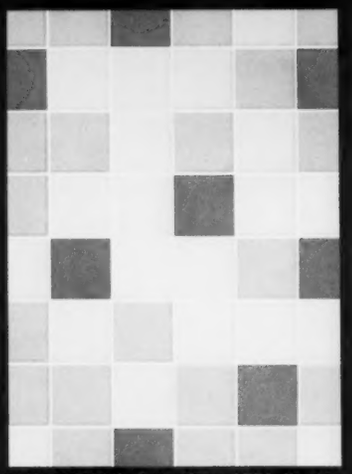

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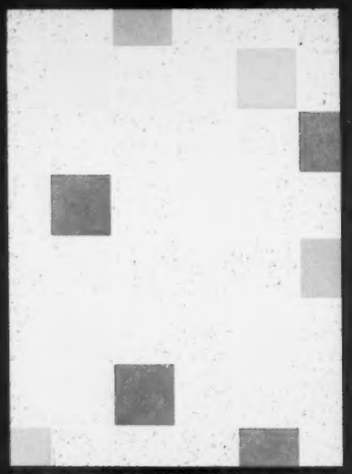

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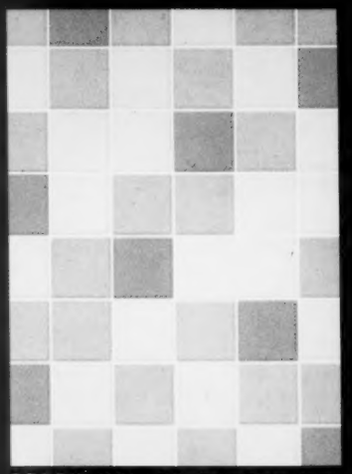

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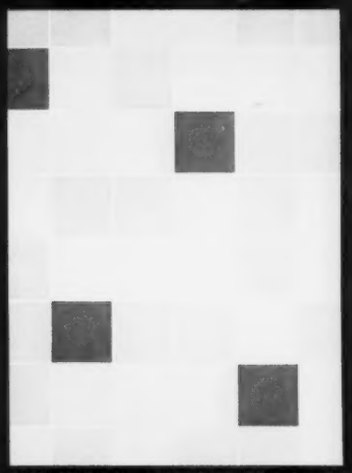

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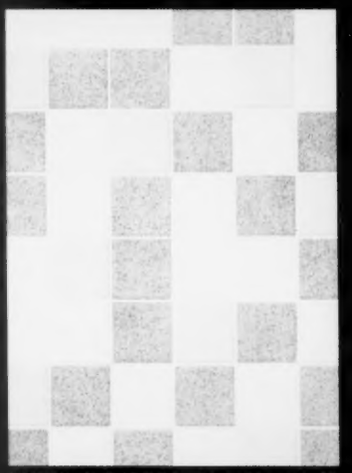

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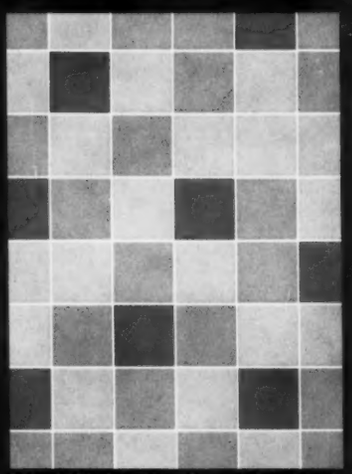

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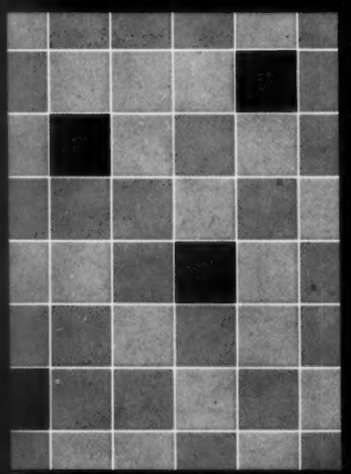

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DESIGN OF CAVITY WALLS TO RESIST CRACKING

by J. Neils Thompson and Franklin B. Johnson

This paper was delivered at the 1960 Spring Conferences of the Building Research Institute. Mr. Thompson is Professor of Civil Engineering, and Mr. Johnson is Asst. Professor of Architectural Engineering, both at the University of Texas, Austin, Texas.

An important feature in the design of cavity walls is that due consideration be given to those design aspects that may effect cracking. From the standpoint of appearance and serviceability, cracks are certainly undesirable. It is my intention to present a few simple illustrations of design features that are important, to indicate the value of discontinuity in structure, to illustrate the importance of structural integrity of components, to provide for expansion and contraction, to give consideration to foundation movements, to consider the properties of materials, and to describe a research program that is under way.

It is believed that from a structural standpoint it is highly desirable to balance the design to give due consideration to strength and rigidity versus flexibility and resilience. Mr. F. O. Anderegg* makes the following comment: "In this country we somehow feel that if we can get just enough Portland cement into our mixes, they are bound to be very strong and durable. European philosophy, on the other hand, seems to be to keep the mortar or unit masonry for stuccos sufficiently flexible to take up the movements of the building that are constantly taking place. Europeans feel they get less leakage through about one inch of higher lime mortar than occurs, for instance, through the cracks that were to develop in a rigid surfacing. The author feels that an appropriate flexibility is a very desirable property to incorporate in our masonry structures."

It has been the experience of the authors in observing structures in the Southwest where foundations, in many instances, are extremely poor and where there are rather substantial movements imposed upon masonry walls, that cavity type walls perform exceedingly well in some instances, and then again do not. There are a number of contributing factors to performance and if proper consideration is given to them, improved performances would result.

Exploratory research is being performed in the hopes of developing an approach to an extensive study on the extent of flexibility that could be permitted in a masonry wall. Also due consideration is to be given to the balancing of the various design aspects in walls.

Causes

Cracking in masonry walls is usually caused by one or a combination of several factors which introduce strain into the wall. These factors include foundation movement, thermal strain, expansion and curling of concrete slabs in wall bearing structures and movement of concrete or steel frame in framed structures. The cracks that result from these strains show up in a multitude of ways.

Damage from differential movement of foundation may result in diagonal, vertical or horizontal cracks, depending on the location and degree of movement. Damage from thermal strain is often found in the form of a vertical crack near the center of a long wall and horizontal cracks near the roofline of parapet walls. Expansion and curling of concrete slabs bearing on concrete walls usually result in horizontal cracks at corners of the structure and in the vicinity of the slab. Movement of framed structures usually causes cracks at the point where restraint is offered. A column that has masonry tied to it is quite likely to be a point of trouble.

Cracks in masonry can be prevented or minimized with attention given to some of the details of design and construction. Cracking from foundation movements is less in the large structures for in these adequate design and soils investigations have been provided.

The suggestions made herein are not original with the authors and many designers utilize these procedures; however, there are many designers who ignore these factors. Also there are frequently other design considerations that must take priority over cracking considerations.

Joints

Thermal strains may be relieved by incorporating expansion joints into the design of structures. Walls have been constructed in lengths of up to 400 feet in length without expansion joints and have suffered no ill effects from extreme temperature changes. The Structural Clay Products Institute recommends maximum lengths of wall to be not over 300 feet for heated structures in moderate climates, with lesser lengths for the more extreme climates, unheated structures and walls with openings. The shape and location of columns and partitions in a structure will also govern the location and spacing of expansion joints.

In framed structures the expansion joint should be a through joint, that is, the joint should go completely through the structure, including floor and roof slabs, partitions, ceilings and walls. *Figure 1.* shows typical expansion joints in cavity walls. The

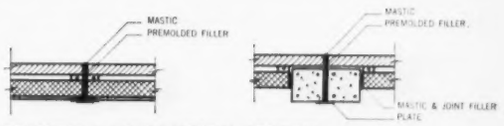

FIGURE 1. EXPANSION JOINTS

details can vary as to method of concealment and weatherproofing, as long as a complete separation is provided. Parapet walls which are subject to cracking from thermal strain should use the same quality of back-up tile as that used in the face brick. This will insure a uniform coefficient of expansion. This uniformity cannot be achieved when back-up material of lesser quality is used. Horizontal reinforcing rods of ¼ inch at 16 inches on center and vertical rods of ½ inch at 24 inches on center placed in the parapet wall will confine and minimize cracking.

Discontinuity of structure

This expression is intended to emphasize the aspect of providing as much freedom as possible between components of the structure and yet maintain integrity in the structure as a whole. This means as much flexibility as is possible between the wall and the foundation, between the wall and the structural frame, between the wall and roof trusses or slabs, and yet have ties that will maintain the integrity of the structure as a whole. It is believed that flexibility is of value in that it permits the structure to "roll with the punches."

Cracking in masonry walls in framed structures can be reduced by freeing the frame from any direct

(Continued on page 12)

*Anderegg, F. O., "Lime-Sand Stuccos in Europe," *Rock Products*, May, 1952.

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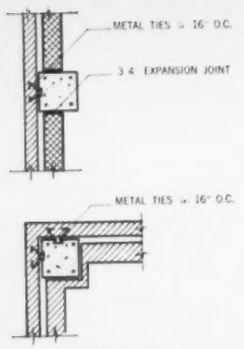

FIGURE 2. TIES WITH COLUMNS

FIGURE 3. TIES WITH BEAMS

FIGURE 4. CURLING OF CONCRETE SLAB

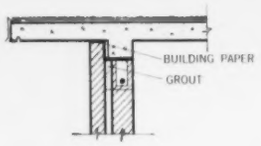

FIGURE 5A. CONCRETE DECK

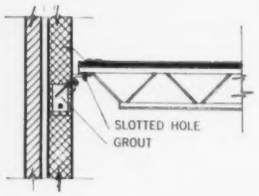

FIGURE 5B. STEEL JOIST TIE

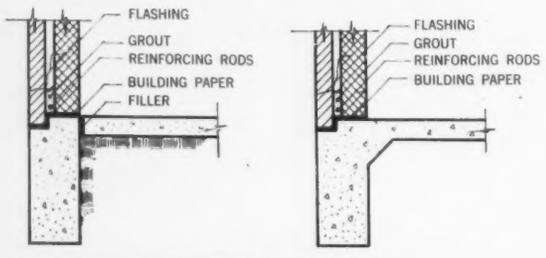

FIGURE 6. FOUNDATION SEPARATION

DESIGN OF CAVITY WALLS

(Continued from page 11)

contact with the masonry. *Figure 2.* illustrates a column in a cavity wall. The masonry does not touch the concrete column and is secured from lateral movement only by metal ties. These ties are flexible to the extent that some relative movement may occur between the column and the masonry.

Figure 3. illustrates beams in a framed structure with the wall adequately anchored but with sufficient flexibility to prevent strains in the frame from being transferred into the masonry.

Roof and floor ties

Thermal strains or other movements are often blamed for cracking in walls when the actual cause is expansion or curling in concrete slabs bearing on walls. *Figure 4.* shows where the curling of a concrete slab has picked up the brick bonded to it. In one place on this structure the slab has picked up the six courses of brick. This behavior is frequently overlooked by the designer in preparing the details of the structure. *Figure 5a.* illustrates some typical details that relieve this condition. In this design the bond is broken between the concrete and the wall by building paper. This will permit the slab to have some freedom in respect to the wall. The slab is also thickened into a beam to stiffen the slab and help minimize curling.

Figure 5b. illustrates a structural system using steel joists bearing on a masonry wall. Steel has a coefficient of expansion of approximately twice that of masonry and if the temperature difference in the materials is large and the steel is firmly anchored to the masonry, then cracking of the masonry will probably occur. The practice has been to anchor the joists or steel in the masonry with government anchors or their equivalent. This in effect rigidly ties the steel to the masonry. This design can be improved by greasing the bearing surfaces and by providing slotted holes in the seats of the steel members. These bolts should be only hand tightened or friction will prevent movement from occurring.

Foundation separation

Figure 6. illustrates typical foundations. In both cases bond is broken between the cavity wall and concrete beam by building paper. The transfer of movements in the foundation to the wall are minimized. A bond beam or tie beam can be formed at the bottom of the wall by placing reinforcing rods and filling with grout. This will tie the inner and outer wythes of masonry together and distribute the strain over a longer length of wall. The above procedure will tend to contain any vertical cracks that may originate at the bottom of the wall. The top of bearing walls should also have a bond or tie beam constructed into the wall for the same reasons. *(See Figure 5a)* Under certain climatic conditions provision must also be made for insulation which has not been shown in these designs.

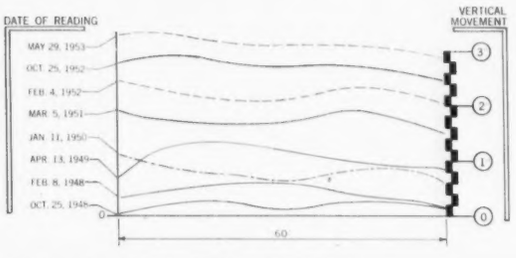

FIGURE 7. FOUNDATION PROFILE

Foundation movements

It is the general opinion that differential movements and foundations supporting cavity walls must be kept to a minimum or serious destruction will result. Differential movements or one-quarter inch in fifteen feet have been considered sufficient to cause cracking in masonry walls. However, observations on cavity-type walls and other masonry walls have shown that differential movements in the foundation of more than one-half inch in fifteen feet could occur and yet the walls remain in good shape and have no cracks.

Figure 7. shows the elevations along a foundation on which rests a cavity-type wall. This foundation is over 60 feet in length. It will be noted that in addition to a large over-all swelling there has been at times considerable differential movement. This wall is resting on a foundation that is firm but is relatively flexible as contrasted with a rigid-type foundation of reinforced concrete grade beams on piers.

Had piers been used in this foundation there would have been relatively sharp breaks in the slopes, causing stress concentrations and high strains at points in the wall. In the flexible continuous footing a gradual change in vertical alignment occurs and therefore the change in slope is spread over a greater distance which results in a wider distribution of strain. By spreading the strains created by these movements over a greater length of the wall, it is possible there is sufficient elastic resilience and plastic yielding of the material to reduce and prevent the rupture of the materials.

Wall panel research

Research pertaining to design of masonry walls is under way at The University of Texas. At the present time this research is exploratory. This study is set up to obtain information pertaining to the behavior of masonry walls as affected by the introduction of movements, temperature, and load. Secondly, though of no less importance, the program is exploratory in nature with respect to technique.

The first phase of this program consists of a panel of two wythes of brick masonry constructed to form a single cavity wall with standard wall "Z" ties every sixth course. This panel was built in 1953. The masonry is of a good grade of burned-face bricks and is bonded with a high strength cement mortar. The brick exhibits an average compressive strength of 7,000 psi and the mortar has a compressive strength of 1,735 psi at 28 days. The wall was built upon a steel base plate with pairs of leveling screws placed at 16 inches on center to provide for controlled movement of the base.

Brass plugs were inserted in the wall to form a grid of 16 inches on center. These plugs are for measuring any changes of distance between plugs that may occur. Work on this wall panel has involved the measurement of distances between the brass plugs in vertical, horizontal, and diagonal directions. Levels on the lower row of plugs have been taken to determine elevations prior to any movement of the base and also after every movement introduced into the base.

The movement of the base plate has consisted of a series of movements of .004 inches that progressively raised the center of the plate. These movements in effect give support to the center portion of the panel and cantilever the ends of the panel. Altogether, the center of the panel has undergone 63 movements for a total of 0.252 inches at the center.

Data has been obtained that gives the elevation in movements that have occurred in this wall since its construction.

The second phase of the investigation of masonry wall panels was started in 1959. Two wall panels were constructed utilizing very low strength mortar. The mortars for the walls had 28-day compressive strengths of 160 psi and 275 psi respectively. These panels were also constructed in such fashion as to permit movements to introduce strains in the wall similar to those that occur in buildings as a result of differential movements of foundations.

This phase is similar in some respects to the panel built in 1953 in that a steel base plate with pairs of leveling screws at 16 inches on center was used in order to introduce into the base the desired degree of movement. Brass plugs were placed in the wall at 16 inches on center, both vertically and horizontally to form a grid so that measurements could be made of any change in distance between plugs that may occur. The panels have a height of 37 inches and a length of 104 inches. They consist of a single wythe brick masonry.

The panels have been loaded and at the present time the load amounts to 300 lbs. per linear foot of wall. The base has been moved so that the center portion of the wall is free of bearing. Measurements of the distances between plugs are being recorded periodically. The levels of the lower row of plugs are also recorded. Thus a record of movements in the wall is obtained.

There are indications that with these weak mortars creep takes place for about 90 days in the walls. Then the support, along with resistance to creep of the structure, becomes sufficient to stabilize the wall.

An evaluation of mortar strength in relation to a masonry wall panel's ability to withstand damage or cracking with severe movement of the base is essential. The idea that mortar strength or type may have some bearing on a masonry wall's performance and on the relative amount of cracking is partially justified because of observations of old existing structures that utilized low-strength lime mortars. Many of these structures have undergone large amounts of differential movement over relatively short distances without cracking or damaging effects. Most of the present-day masonry structures utilize high strength masonry cement mortar. Most of the interior partitions of a masonry structure are not wall bearing. In these cases a high strength mortar may not be justified, particularly from the standpoint of the load carrying capacity required.

Summary

Every structure must meet particular requirements and most be designed accordingly. Details that are satisfactory on one structure will not necessarily be workable on another, but designs can usually be found that will minimize the possibility of damage from cracking in masonry walls. The criteria for minimizing the cracking in a structure can be summed up as follows: (1) provide bond or tie beams at the top and bottom of walls wherever possible; (2) break the bond between dissimilar materials with building paper or flashing (e.g., between concrete foundations and masonry walls, and concrete slabs bearing on masonry walls); (3) provide an adequate number of vertical expansion joints to reduce thermal strain; (4) provide freedom of restraint of structural members where the structure is framed. This may be accomplished by using flexible ties and clearing column of direct contact with the masonry wall.

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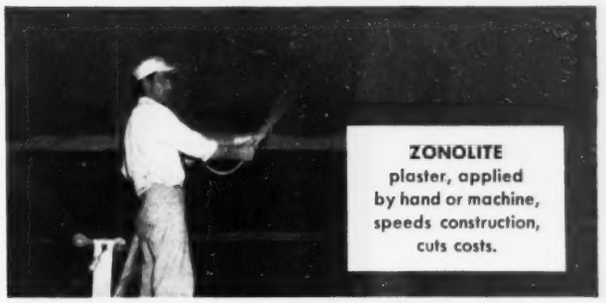

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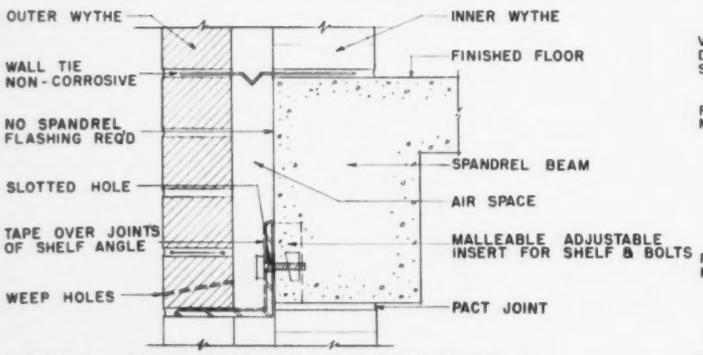

FIGURE 1. TYPICAL RETRACTED SHELF ANGLE

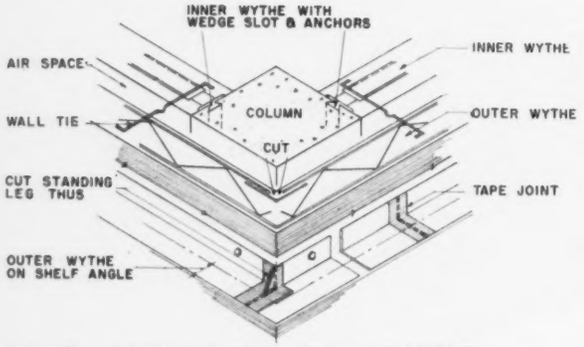

FIGURE 2. CORNER DETAIL AT SHELF ANGLE MULTI-STORY NON-LOAD BEARING CURTAIN WALL

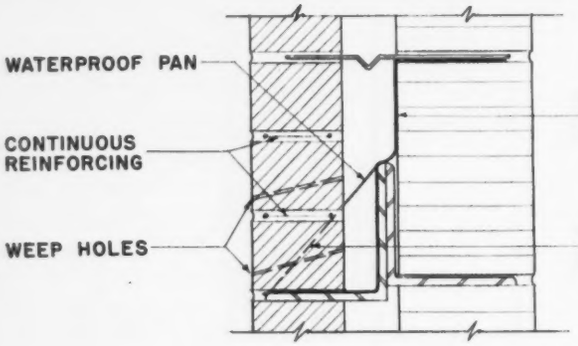

FIGURE 3. LOOSE LINTEL WITH PAN FLASHING NOT CONNECTED TO STRUCTURAL FRAME

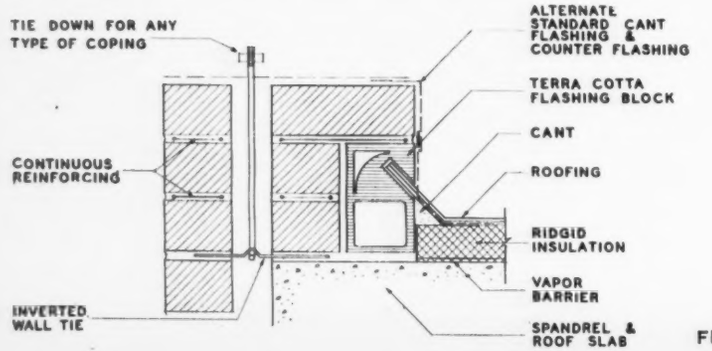

FIGURE 4. CAVITY PARAPET

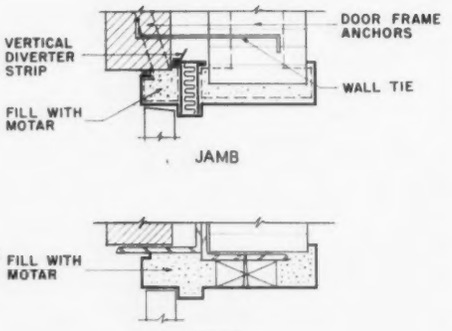

FIGURE 5. METAL DOOR FRAME

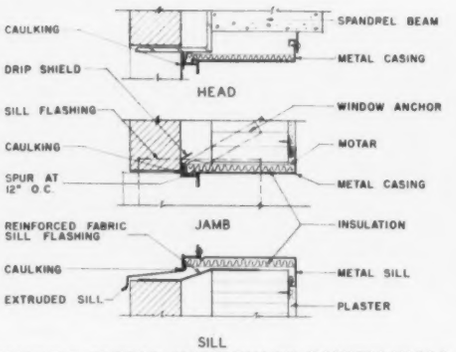

FIGURE 6. METAL WINDOW IN CAVITY WALL

by Clarence B. Litchfield, AIA

This paper was delivered at the 1960 Spring Conferences of the Building Research Institute. Mr. Litchfield is a partner of the firm, LaPierre, Litchfield & Partners of New York City.

The experience of our firm of architects, LaPierre, Litchfield & Partners and our predecessor firm of Alfred Hopkins and Associates on cavity walls extends back to the late 1920's, particularly in our correctional institution work where we wanted a good economical, solid masonry interior finish.

I will never forget our first submission of the cavity wall to the Federal Architect who was then part of the Treasury Department. The late Elwyn E. Seelye was our consulting structural engineer. The floor structures rested on an 8" and 12" inner concrete block wythe, 1" air space and a 4" brick exterior wythe. We were made to change the inner wythe to a 4" concrete block furring wythe and the exterior brick was thickened to support the floor and roof slabs. This was in 1930 and this change showed that government supervising agencies were not then aware of the advantages of the cavity wall.

We continued to be impressed with the economies and watertightness of the cavity wall and continued its detailed development through the 1930's. Of course, these were in structures of three or four stories—there was not much else in building at that time. However, this study did prepare us for our many experiences during World War II when many millions of dollars worth of economical fireproof buildings were wanted that also looked inexpensive. I recall one act of Congress in 1940 that was passed for design and construction of A Petty Officers' Training School for the U.S. Coast Guard located on the waterfront near Groton, Conn. That bill stated the structures were to be "of reinforced concrete of a temporay nature." The Admirals and Captains were scratching their heads wondering just what those descriptive words meant. I anticipated that the architect who interpreted that description to the client's satisfaction might get the job. We proposed a reinforced concrete system of columns and floor slabs and enclosed it with a cavity wall, having an exterior wythe of 8" concrete block, 2" air space and 4" concrete block inner wythe. Wartime economies required the exterior wythe to support itself for the full height; the interior wythe only extended from floor to ceiling of each floor level. The job was a rush to design and construct. Fred Severud was our structural engineering consultant and Vermilya-Brown built it in record time. No leaks occurred anywhere in spite of the rush, and heating costs were low. The same experiences went on throughout the war. The result showed that the cavity wall could take a real beating from the weather, and in spite of a short and sparse labor market, was weather-tight even on the most exposed ocean-side locations.

Bellevue Nurses School

After the war, the modern history of the cavity wall in our office began. Immediately after cessation of hositilities, the design of the long anticipated new buildings for the block-square Bellevue Hos-

pital Nurses School, which is located on 24th St., New York City, was begun by us which included a 13-story, 120-foot high central block. Jaros, Baum & Bolles were our consulting mechanical engineers and Fred Severud was our structural engineer. In this project, many of the new ideas that had been developing during the war period found expression, with fully modular dimensioning, carefully studied coordination of standard building materials into the nearly 1,000 bedrooms, new sound reducing partitions 2⅛" thick, radiant panel heating, and the use of the cavity wall in a high rise building, constructed with modular brick and the newly developed retracted spandrel beam. *Figures 1.-6.* illustrate details of typical construction of a cavity wall.

Ten inch thick cavity walls, supported at each floor spandrel with 4" brick exterior wythe, 2" air space and 4" thick block interior wythe plastered directly on the block, replaced the previously used solid walls and furring up to 24" thick, which nevertheless leaked often during the storms coming from the ocean and over the East River; it was gratifying to find not a single leak in the new construction. We did not supervise this work ourselves, which was undertaken by the N.Y.C. Department of Public Works. We are grateful to Commissioner Frederick H. Zurmuhlen's inspectors for maintaining the standards of workmanship and cleanliness of the wall cavity that enable it to perform its job of insulation and keeping out the weather. No coatings or waterproofing agents either on the brick or in the mortar were employed. Our approach to the cavity wall design is that complete exclusion of water through the outer wythe is impossible to achieve under strong wind pressure. By the time any penetrating moisture reaches the cavity, it will trickle harmlessly down the back of the outer wythe, to escape through the weep holes, located at each floor spandrel. We had already demonstrated to our own and our mechanical engineer's satisfaction the improved thermal insulation value of the empty cavity. We refrained from filling it with other insulating agents, which, in our opinion, can only serve to act as a water bridge between the exterior and interior wythes, that we strive so energetically to eliminate.

Gun Hill Houses

In 1949, we were awarded a commission to design Gun Hill Houses for the New York City Housing Authority located in the Borough of the Bronx, New York City, with 733 dwelling units which worked out to be six 14-story apartment buildings. Along with our sketch plans, we proposed cavity wall construction with reinforced concrete columns, floor and roof slabs. If my memory serves me truly this was the first proposal of the cavity wall to the New York City Housing Authority. Our structural consulting engineer, Fred Severud, and mechanical consulting engineer, Guy B. Panero, were as enthused with the wall as we were. Together, we compiled figures of estimated construction cost, heat loss, etc., compared to the usual solid wall. Our proposal was accepted and Gun Hill Houses stand as the first cavity wall used by the Housing Authority. Still no leaks, and construction difficulties consisted mainly in educating mechanics into keeping the air space free of mortar droppings and electric conduits. All mechanics seem to want to fill that air space, for it is an easy way to make horizontal runs.

Brooklyn House of Detention

In 1950, the design of the Brooklyn House of Detention at Atlantic Ave. and Smith St. started and

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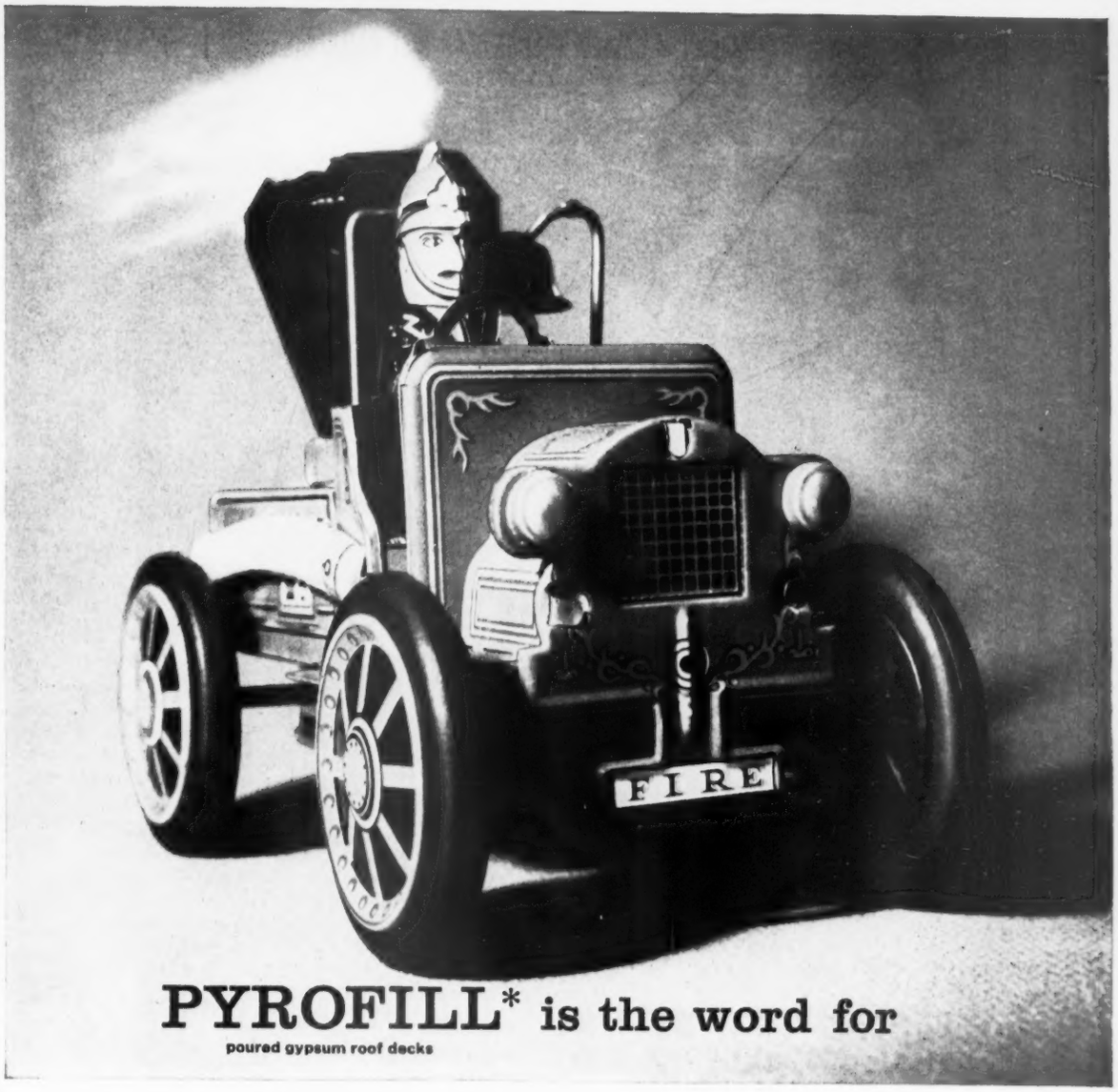

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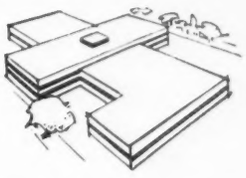

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PERFORMANCE EXPERIENCED WITH MASONRY CAVITY WALL IN HIGH RISE BUILDINGS

(Continued from page 15)

FIGURE 7. GEORGE WASHINGTON HOUSES

FIGURE 8. BAGHDAD MEDICAL CENTER

again we proposed the cavity wall to the New York City Department of Public Works for the yard court walls. Commissioner Zurmuhlen approved it and during construction his department had full charge of supervision. This is a steel structure enclosed partially by a security grid with 2" thick solid glass block curtain wall and partially by the cavity wall. The building is ten stories tall, 190 feet high with two tiers of cells between most of those floors. The performance of the cavity wall has been entirely successful.

Veterans Hospital

In 1951, the construction of the New York City Veterans Administration Hospital was begun for the New York District Corps of Engineers. Severud-Elstad-Krueger and Guy Panero were the consulting engineers. This is a hospital of 20 floors in height and a bed capacity of 1,252. It is the tallest cavity wall building of our experience or knowledge. It is pleasant to report no difficulty from wall leaks or condensation. Modular 12" x 4" x 4" buff brick forms the exterior wall with dark red enameled brick, also modular size, as color contrast on the transportation core tower and certain spandrels.

No special provisions were necessary, in the opinion of the structural engineers, due to the height of the project. The wall again consists of the outer 4" brick wythe, the 2¼" completely unbridged and empty cavity, and a waylite block inner wythe plastered on the room side. Non-corrosive drip-type bronze anchors were used and the bottom of each cavity resting on the spandrel shelf angle was flushed clean with a hose stream before the mortar dropping had time to set up. A brick was left loose at that point every ten feet or so, and mortared in later.

George Washington Houses

This project *(Figure 7.)* consists of 1,515 apartments in 14 buildings, 14 stories high. Here the lighter weight of the 10-inch wall (actually 8 inches of masonry depth) contributed to the decision to use shorter friction piles in an area where long bearing piles were usual and, of course, would have added materially to costs.

Baghdad Medical Center

The new Medical City*(Figure 8.)*, 11 stories tall, for the legendary city of Baghdad in Iraq will demonstrate the values of the cavity wall for use in a sub-tropical climate. In this case, top ventilation of the cavity to the exterior will give useful air movement within the cavity to reduce the wall temperature.

Thermal insulation values

In the early days of cavity wall design, thermal insulation values had to be computed through the various layers or elements of the wall—comprehensive testing of the entire assembly was expensive, time consuming, and made difficult by the variety of materials that the wall could be made of. The recent research programs will enable both the architect and heating engineer to proceed with more certainty than formerly, when heating design had to assume a "safe"attitude, with the frequent consequence of unnecessary radiation being removed from the building later on.

A word on condensation. The absence of a deliberate vapor barrier on the inner face of the wall must allow water vapor to migrate to some point in the inner wythe, maybe on to the cavity and maybe on to the outer wythe, but it must be dissipated in our benign climate, for no ill effects have shown up to trouble us.

C T G & M

Ceramics, tile, glass and masonry—each is a time-honored material used in architectural construction. A/E NEWS presents a brief review of various developments and applications of these building materials. Symbolic of the popularity of a traditional material—brick—is its use in the 244-foot high tower shaft (SHOWN LEFT) of the newly completed Pittsburgh-Hilton hotel. Architect: William B. Tabler, AIA, New York City.

CERAMICS

Corrosion-resistant coatings

The decade ahead will see the coming of age of architectural and industrial applications of porcelain enamel, corrosion-resistant ceramic coatings and high-temperature ceramic-coated metals, according to Robert A. Weaver, Jr., president of the Bettinger Corp.

He believes that the past ten years of intensive technological research have provided the basic knowledge of material and processes required to make possible modern applications of both the centuries-old porcelain enamel art and the new technology of ceramic coatings.

The $7 billion-a-year bill for corrosion would be tremendously reduced by known applications of the protective qualities of ceramic coatings and 25 per cent of every plant maintenance dollar which is spent for painting could be almost entirely eliminated according to industry spokesmen.

In the 1960's, four major areas of technological breakthrough for ceramics-on-metal will be in architectural applications, both in monumental buildings and residential construction; commercial, light industrial and heavy industrial applications; corrosion resistant products for industry; and high temperature "aero/space age" applications.

Architectural applications in curtain wall construction for monumental buildings is the most advanced of these in that prototype houses with porcelain enamel exteriors are now possible.

A modular-design packaged service station, introduced last year, has already undergone successful introduction with six major oil companies. Ease-of-maintenance buildings for other multi-unit applications, such as launderies, miniature supermarkets, dairy farm buildings and roadside restaurants, can be constructed competitively with other materials using the same basic principles.

In industrial construction, a corrugated steel roofing and siding material with a single-coat ceramic skin has been proved out in the most corrosive applications of the metal working industries. Now available in a variety of colors, the material is adaptable to a high percentage of industrial buildings. Working with an overlooked but versatile material, industry spokesmen now have definite knowledge that the art of ceramic coating has exciting and very specific applications in modern industry.

Other ceramic developments

A heavy duty tile adhesive for bonding steel to such sub-floor surfaces as concrete and terrazzo has been developed for use on industrial floors. The adhesive, called C-560, is a two-part product consisting of basic resin compound and separate hardener, stated to resist attack by lactic acid, grease and fat.

A transparent polycrystalline ceramic, made from powdered aluminum oxide has metallic structure, transmits light similarly to glass. The new material, developed under the proprietary name of *Lucalox*, has high strength characteristic of alumina ceramics and can withstand much higher temperatures than most ceramics now in use and can be pressed into any shape desired. Microscopic small pores normally found in ceramic materials are said to be entirely removed in this new development.

The world's largest adhesive-bonded tile facade was completed recently in Calgary, Canada. Forty-two thousand square feet of ceramic tile facing was bonded to metal framed structural panels on the eight-story Alberta Wheat Pool Office Building with a special exterior type tile adhesive.

This new structure represents a ceramic tile installation 30 per cent larger than any previous one in North America. More than 7,200 individual tiles were used on the exterior panels. The finished wall of metal-framed, insulated, interlocking structural panels provides a finished wall no more than 3½ inches thick, yet with thermal insulating values exceeding that of standard masonry and most curtain

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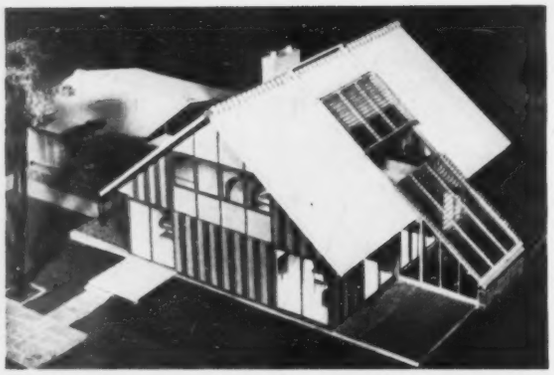
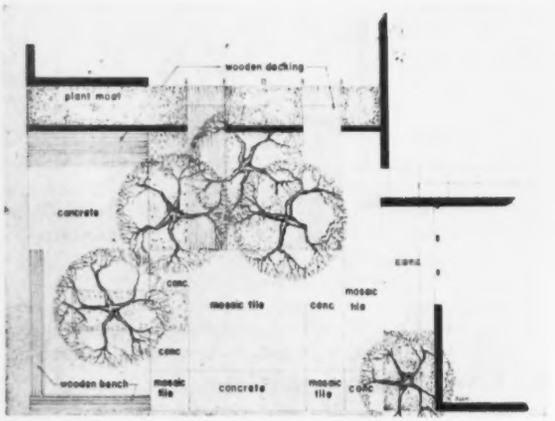
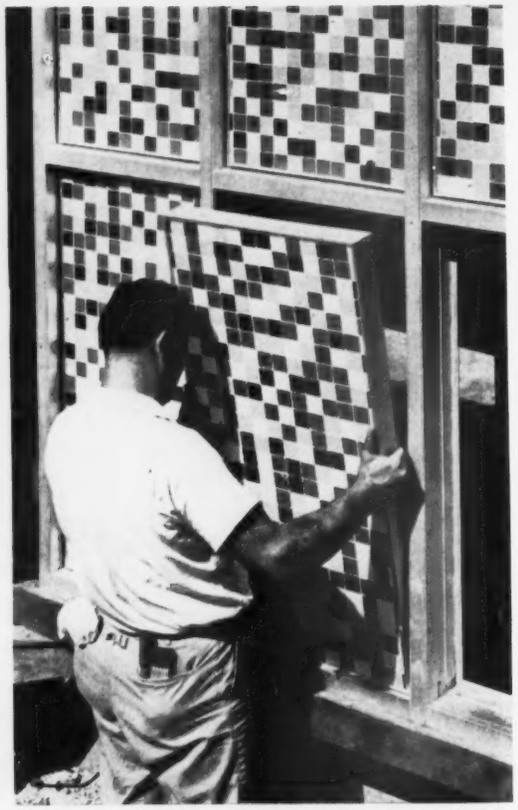


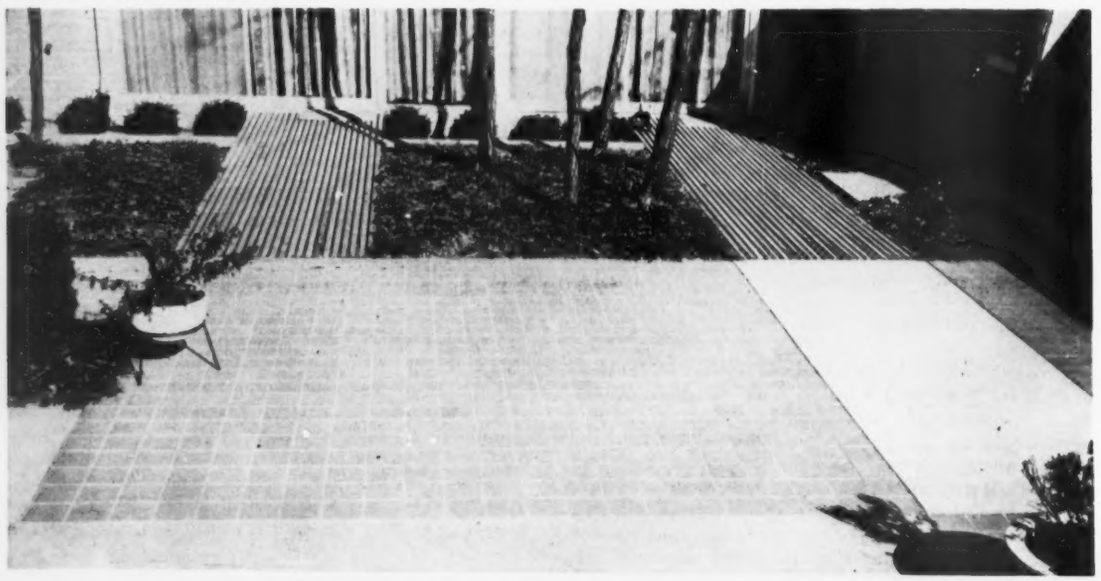
Prior to actual construction of the Ferro Porcelain Enamel Research House at Cleveland, Ohio, a half-size section of the house was erected at U.S. Steel Corp.'s Research Center in Monroeville, Pa. Purpose of the "dry-run" mock-up is to provide a problem-solving unit on which roof and wall panels, and window and door sections could be mounted in order to facilitate the erection of the full-sized house, utilizing ceramic coatings on steel. Architect: Carl Koch, AIA and Associates, Cambridge, Mass.



This is the plan of the "McCall's" Magazine Cincinnati house patio (ABOVE) as prepared by Robert Zion and Harold Breen, Landscape Architects and Site Planners of New York. Quarry tile and concrete treatment, together with wooden decking is used (BELOW) on the patio, adjacent to the family room. This house was built by McCall's to demonstrate use of various materials, both indoors and out.



The East Orange, N. J., High School utilizes a curtain wall assembly with a ceramic mosaic spandrel. Shown here is a mechanic setting panels into the grid after an elastic tape has been installed to seal the interior joints of the frame. Panels are composed of 19/16" ceramic mosaics in a pattern factory-applied to both sides with CTL adhesive on 1/8" asbestos cementboards with a foamed-plastic insulating core. Each panel is perimeter bound by an anodized extruded aluminum channel. Architect: Emil A. Schmidlin, AIA of East Orange N. J.



CTG&M

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wall systems. The adhesive, set by a "thin-set" method, is especially formulated with non-oxidizing resins for exterior installations and prefabricated ceramic tile panels has passed safety requirements. Extensive tests were given to sample panels under severe laboratory tests to simulate extreme weather and load conditions.

Lightweight block

A long-sought building material, ceramic glazed lightweight aggregate building block, is now a practical reality. Four formulations for low temperature firing glazes, made possible by lead compounds in them, are available. The blocks are made light by the inclusion of up to 12 per cent of expanded vermiculite in a clay matrix. The product is now in pilot plant production. Successful pilot production runs have been completed using concrete block machines and "soft mud" brick molding machines.

Delivered costs of the block are anticipated to be competitive with concrete block because of significant savings in shipping and handling. The reduced dead weight means that structural supporting requirements, particularly for multi-story buildings would be considerably lower. An additional advantage is the extremely high insulating quality of these blocks—with a U-factor of one half that of the dense blocks—which means lower heat losses from the building.

The architectural design potential of these blocks has been enormously increased by the development of colorful, permanent glazes. An exhaustive development program was carried out by the producer to find glaze formulations that would yield glazes with the desired textures and colors. Of all the compositions that were tested, only the lead glazes gave consistently good results.

The ability of lead to promote glaze-body reactions, coupled with a controllable viscosity and low surface tension, made it possible to formulate glazes with varying textures—from a rough to a smooth, high gloss texture—despite the relatively rough texture of the fired block.

Glazing can be accomplished during the firing of the block—called "single fire" glazing in the structural clay industry. Or, the fired blocks can be ground to precise dimensions—the block grinds easily—and "double fire" glazed at a lower temperature.

Three general grades of lightweight block can be produced—10 lb., 20-lb., and 30-lb.—depending on the percentage of vermiculite included in the mixture. Standard concrete blocks, on the other hand, with a nominal block size of 8 x 8 x 16" weigh about 40 to 45 lb. The 20 and 30-lb block types have high strength and, in this regard, meet the *ASTM* specifications for class A concrete block (ASTM C90-52-1,000 psi compression strength over gross area).

The 10-pound block is lower in strength and is not designed for structural applications. It will be useful for unloaded interior walls, in hospitals, schools, industrial plants, etc., where its permanent ceramic color will provide an easily cleaned, colorful finished interior surface without the necessity of an additional finishing operation.

Vermiculite is a lightweight aggregate material weighing only 7-lb. per cubic foot after being expanded. It is compatible with clay materials and can withstand firing temperatures up to 2,100° F. Above

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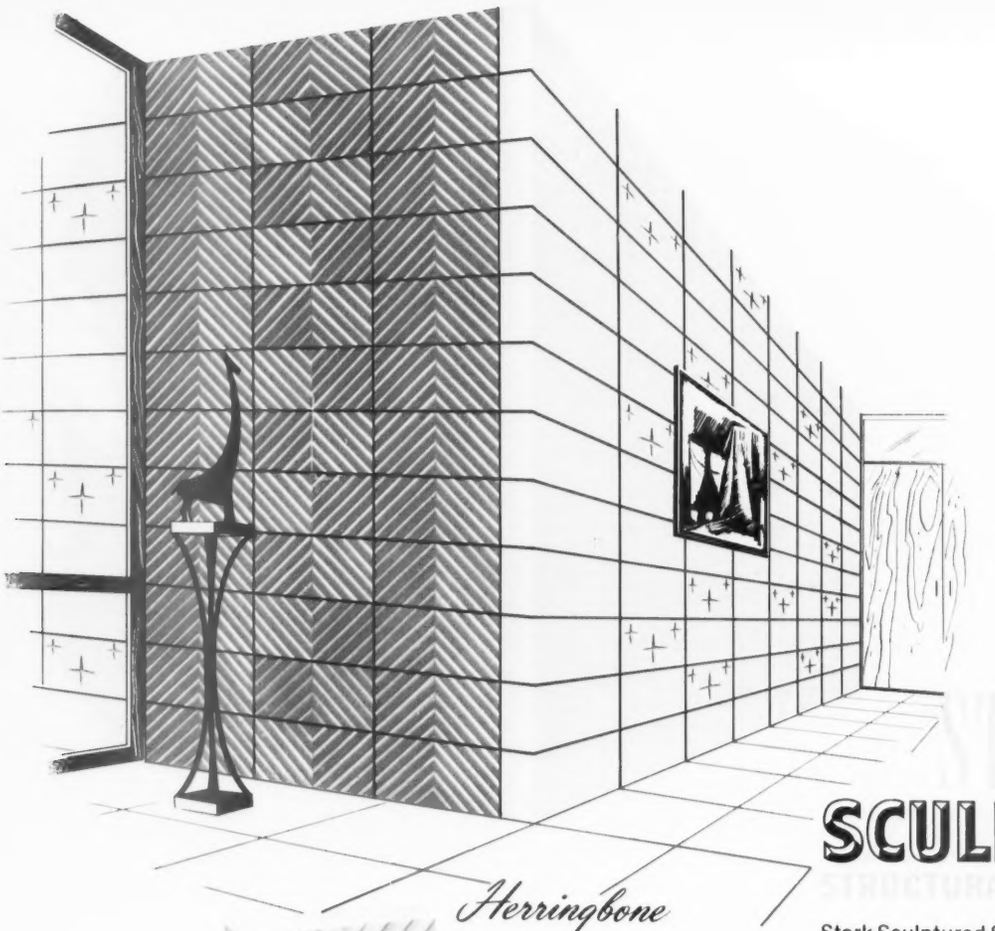

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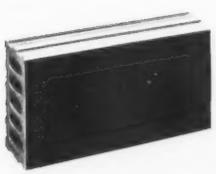

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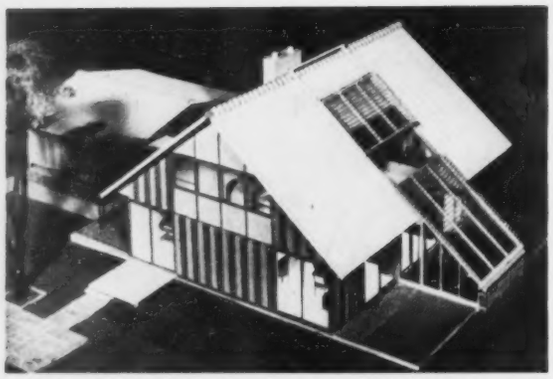

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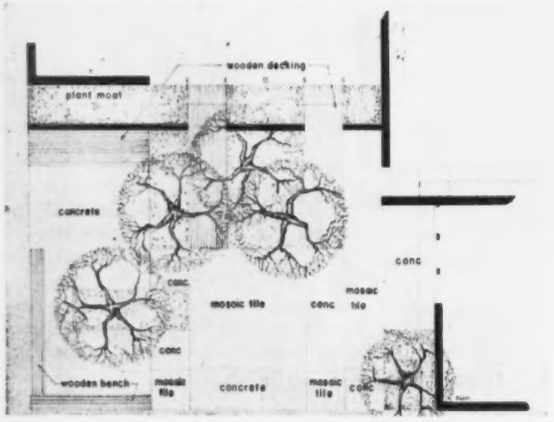

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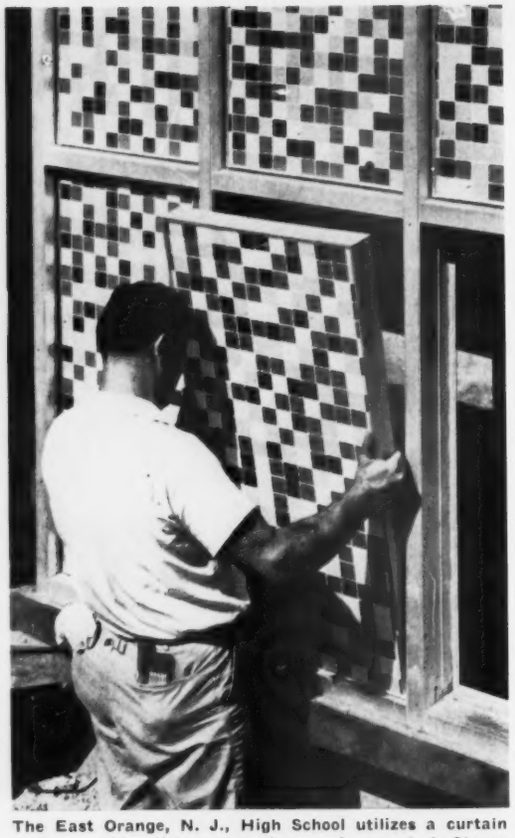

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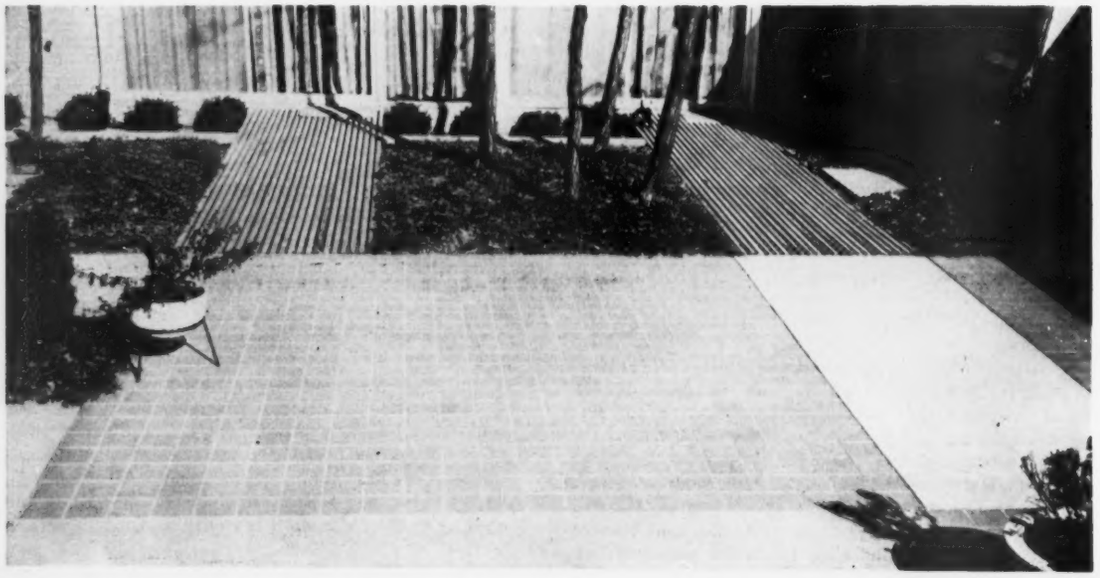

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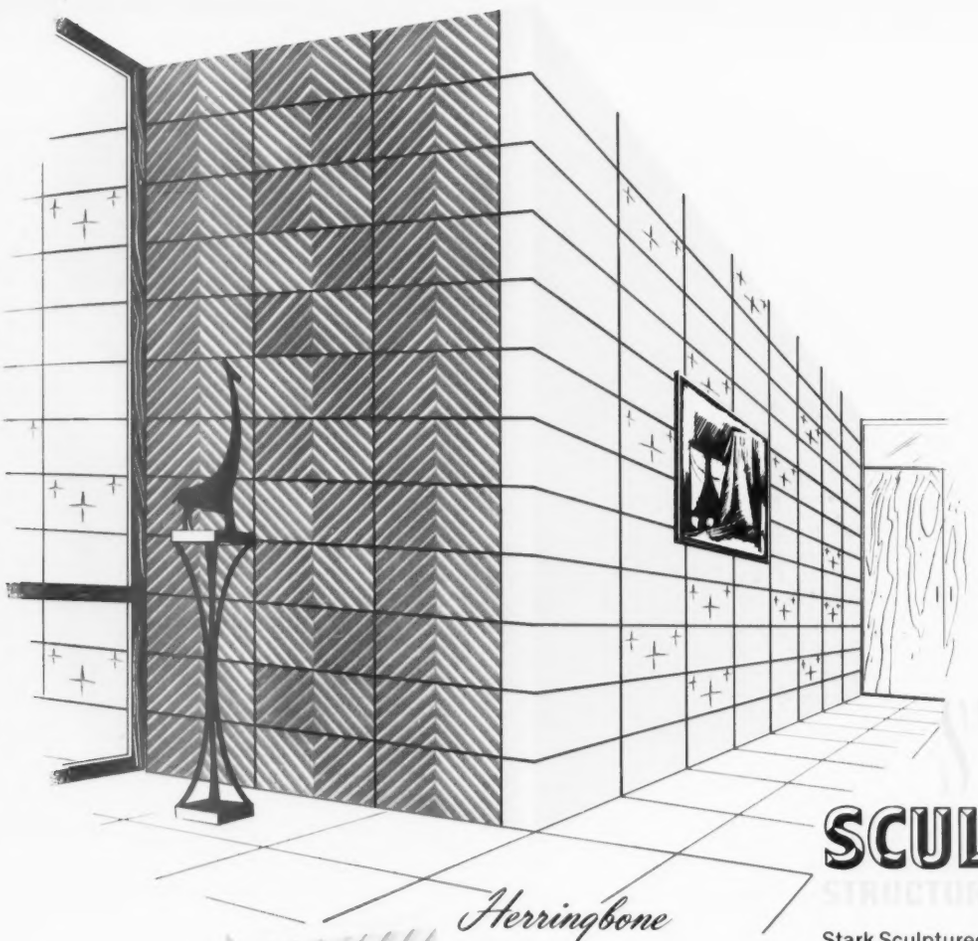

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Galaxy

Deep-sculptured contemporary star forms. May be used as over-all motif or as decorative inserts.

Louver

Especially suited for feature stripes and panels, installed vertically or horizontally, running or stack bond.

Classic

Highly effective for large wall areas, particularly in institutional or monumental type architecture.

Stark Sculptured Structural Tile is a new addition to Stark's complete line of structural Glazed Tile. This new wall concept is a perfect combination of all the well-known qualities of Structural Glazed Tile and a series of versatile sculptured designs.

This unique product offers opportunities to create easy to clean walls with depth and dimension in an almost unlimited range of patterns and colors.

Unusual, custom walls are now within the range of every building budget . . . no other product offers ALL these essentials: initial economy, beauty, texture and pattern, permanent ceramic glazed finish, durability and low maintenance.

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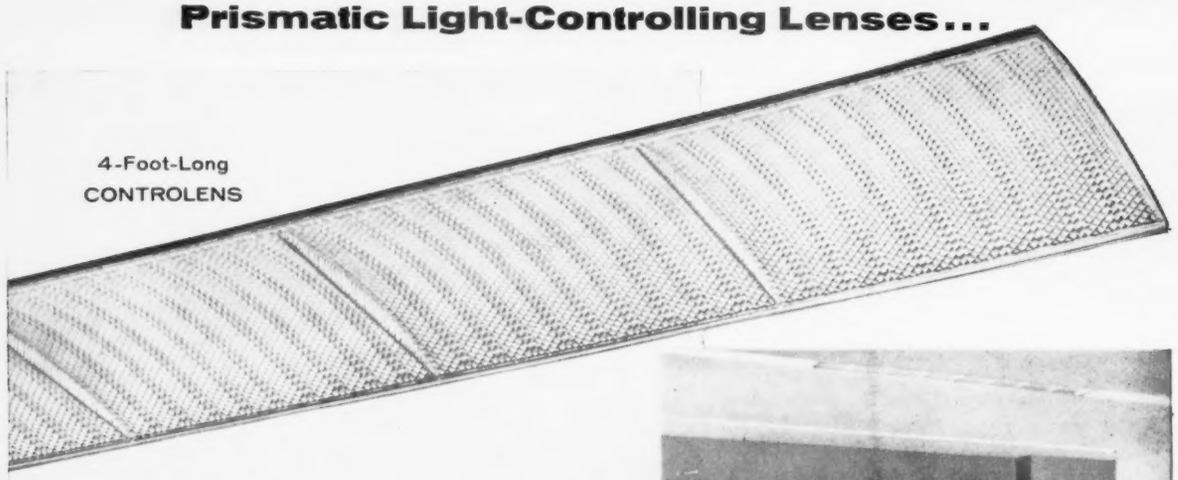
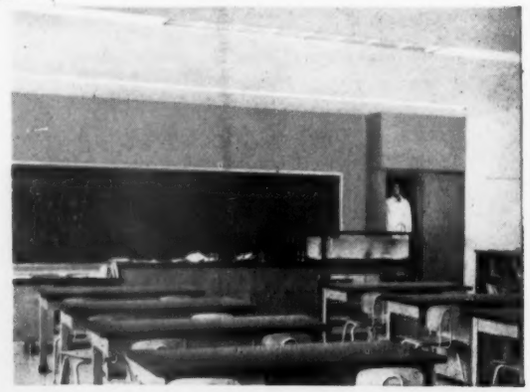
ACRYLIC PLASTIC...The Proven Material for Modern, Prismatic Light-Controlling Lenses...



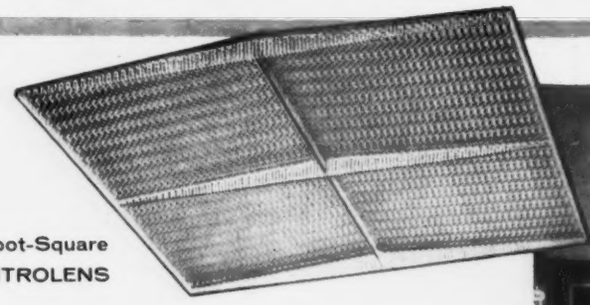
4-Foot-Long
CONTROLENS

Wherever the PRISMALUME CONTROLENS has been used it has delivered consistently superior performance: high level illumination with the utmost visual comfort. Its prismatic construction provides effective light control with the best "hiding-power" to conceal light sources. The use of crystal-clear acrylic plastic produces a CONTROLENS that is light in weight, shatter-resistant, free from discoloration and altogether different in its distinctive, quality appearance. Reinforcing struts assure great dimensional stability... Available in a variety of shapes for a wide range of fluorescent applications.



4-Foot-Long CONTROLENS, singly or in continuous runs, are advantageously used in classrooms, offices, banks, showrooms, libraries, stores, lobbies and laboratories.

HOLOPHANE PRISMALUME® CONTROLENS®



2-Foot-Square
CONTROLENS

The flexibility of the 2-Foot-Square CONTROLENS makes it adaptable in many ways, such as: • Geometric groupings (one or more lenses)... • 2-ft-wide continuous troffer runs... • Large luminous panels.

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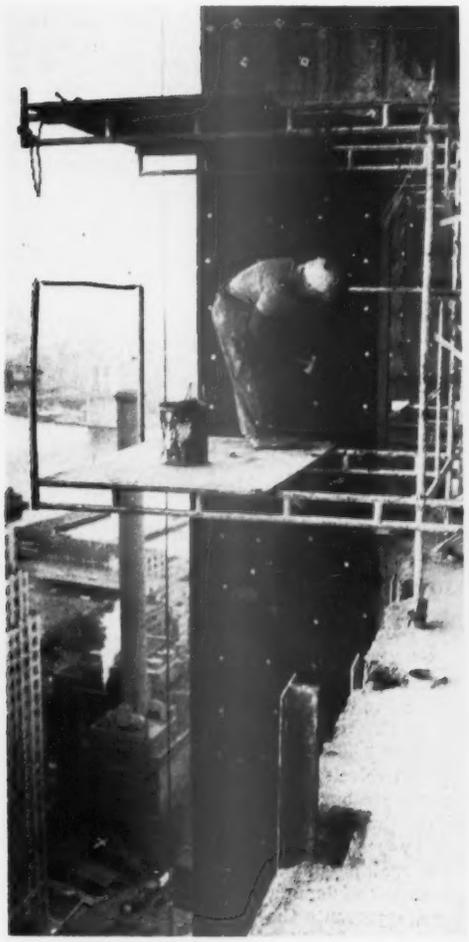
Circle 107 **for further information**

Exterior view of Central Park School at Dundas, Ontario has curtain wall of glass blocks, reputed to have the insulating value of an 8-inch masonry wall (photo left). Interior view (right) shows design of color provided by the architects by incorporating red, yellow and blue glass blocks. The glass blocks have a fired-on ceramic finish that is almost as scratch and abrasive resistant as the basic glass. It is unaffected by industrial atmosphere. Light passing through the translucent color gives a glowing, changing color on the inner surface. Architects: Allen and MacIver of Hamilton, Ontario.



Views of workmen (left and right) installing cellular glass blocks on outer columns of new 60-story Chase Manhattan Head Office Building in New York. Four-inch thick blocks were adhered with mastic and also impaled on spindle anchors over which clips were driven. The cellular glass blocks insulate the columns from temperature changes that would cause movement in the structure. The material, composed of millions of sealed glass cells, is unaffected by moisture. The columns are then sheathed in aluminum. Architects: Skidmore, Owings & Merrill.

C T G & M

(Continued from page 20)

this temperature, the vermiculite begins to melt. The block manufacturer will be able to expand this material himself and the clay matrix can be any raw material that is suitable for structural clay products.

GLASS

Architectural glass panels as shatter-proof and as scratch-proof as the windshield of one's car are now being developed. Mirrors suitable for such problem spots as school locker rooms and naval ships will provide safety and long life. The familiar "stand-by" laminated safety glass is now receiving new uses as producers are striving to develop thousands of colors, textures, patterns and designs into laminated safety glass to form a distinctive building and decorative material with outstanding beauty and versatility. Applications for a home include room dividers and screens, doors, bathtub and shower enclosures, table tops and trim for fireplaces, kitchen cabinets and many other places.

With innovations in home design, plus a sharp upsurge in church and institutional building, several laminated glass manufacturers offer more than 200,000 possible combinations of color, design, inserts and background in decorative laminated safety glass. Standard geometrical designs, and carefully tested and selected colors that can be applied by silk screen printing, brushing or spraying, make this possible. In addition, natural inserts ranging from butterflies and leaves to fabric and metal flakes, offer additional decorative possibilities. One major glass supplier designed a special two-way mirror for a Las Vegas casino. The patrons in the casino could only see a decorative mirror surface while office supervisors above could look right into the casino, unobserved. Most architectural glass is tailored to more conventional uses, however. The newest product is a laminated glass window designed for churches, while one of the oldest—bullet-resistant glass made up of several alternate layers of glass and "Butacite"—dates from the 'twenties. Interestingly enough laminated safety glass was first conceived as a safety lens for gas masks during the first World War.

Cellular glass application

Skidmore, Owings and Merrill, architects of New York's newest skyscraper, the 60-story Chase Manhattan Bank Building at William and Pine Streets, utilized exterior columns as a means of gaining uninterrupted interior spaces.

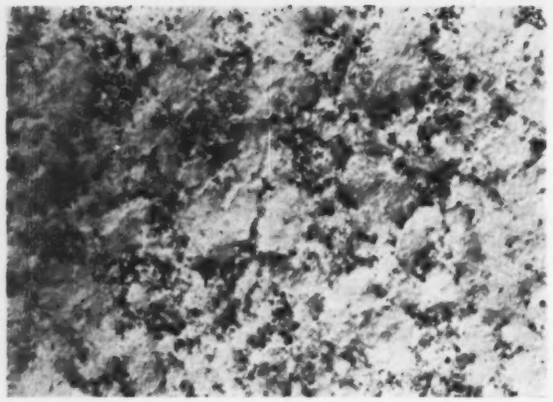
This posed the problem, however, of the effect of severe temperature changes on the exposed columns. The building towers 840 feet, and considerable expansion and contraction in the columns was anticipated. These movements, of course, transmitted to the building structure, could cause trouble.

The architects decided to cover the columns from the 30th floor up with a layer of cellular glass blocks. Four-inch thick blocks of the material were attached to the columns with both spindle anchors and mastic. The columns were then finished with aluminum sheathing.

The unique cellular glass material, being composed of millions of tiny, sealed glass cells, is unaffected by moisture and is dimensionally stable—important for this usage.

A two-inch layer of cellular glass was also used on the roof of the building, as well as under the plaza area. Here its ultimate compressive strength of over seven tons per square foot was of special importance.

(Continued on page 22)



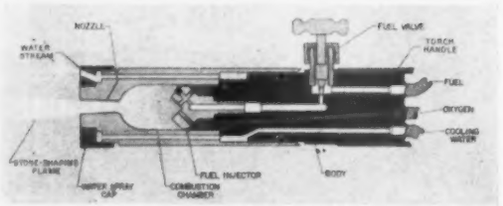
Close-up of flame-treated granite surface shows interesting and dramatic visual effect created by new process. Darker areas of mica and biotite are raised above the spalled areas feldspar and quartzite. Sunlight at various angles creates sparkling highlights giving granite everchanging appearance.

Part of one of the two new lanes on Manhattan's Queensboro Bridge can be seen to the left rear of the operator as he is burning off a one-foot deep section of the large pier, clearing the way for completion of the new road. This new jet-flame process was used extensively on this project.

This granite statue was shaped out of a 10 ft. x 3 ft. x 2 ft. block of solid granite with the stone-shaping torch. The sharp detail of the facial features of this statue indicates the shaping accuracy possible with the new process.

CTG&M

(Continued from page 21)



Cross section of the stone-shaping torch. Outer torch body is lightweight aluminum. Burner and injector are made of oxygen free high conductivity copper for maximum heat dissipation. Oxygen fuel and cooling water enter through back end of torch. Fuel and oxygen are mixed at injection point and ignited in combustion chamber to produce 5,500 ° F supersonic flame. No 1 or 2 diesel oil or kerosene can be used as fuel.

MASONRY

Jet-flames carve stone

The rocket jet principle that generates the tremendous energy needed to power our modern missiles and rockets has been put to another use. Small rocket-jets of flame similar to larger afterburner flames of jet planes can now be used to carve and shape stone five times faster than mechanical methods.

Known as "stone-shaping," this unique process, developed and patented by a division of the Union Carbide Corporation, promises to give a terrific boost to the stone-working, building, and construction industries. Up until now, stone workers have had to carve and shape monuments, architectural building materials and other stone products, using the same slow mechanical chipping methods that the ancient Egyptians used to carve their hieroglyphics.

Works fastest on harder stones

The new process works fastest on the harder stones, such as granite, quartzite, syenite, sandstone, and taconite, which conventional methods find toughest.

Stone is more durable than most wrought materials but costs and difficulties in shaping have prevented stone from finding wider use in present-day structures. Now that the rocket jet flame has been harnessed into a small, easy-to-handle, manual torch, stone workers will be able to perform stonework formerly considered impossible or uneconomical. The new process, it is suggested, can be used to shape mausoleum roofs, monuments, curbing, gutter mouths, building coping, compound angled drainage slabs, or any other spallable rock structure.

Tremendous energy in small flame

The jet flame represents one of the highest concentrations of energy available to man. At its highest velocity the small flame has a mechanical energy equivalent of more than 25 horsepower, yet this energy is contained in a slim flame only 4 inches long. Traveling six times faster than the speed of sound and reaching temperatures of 5,550°F., the rocket-jet flame spits out of a small manual torch and weighs slightly over 7 pounds and is only 37 inches long.

A construction tool

In addition to its use as a quarry and sculpturing tool, the new process is expected to find widespread use in the construction industry. For example, the torch is now being used to tailor-cut granite sections as part of a remodeling job on the huge two-decker Queensborough Bridge in New York City. This job is part of a project to widen the lower level of the bridge from five to seven lanes. This same type of work can also be done on highway and railroad bridges and tunnels.

Produces luster in granite

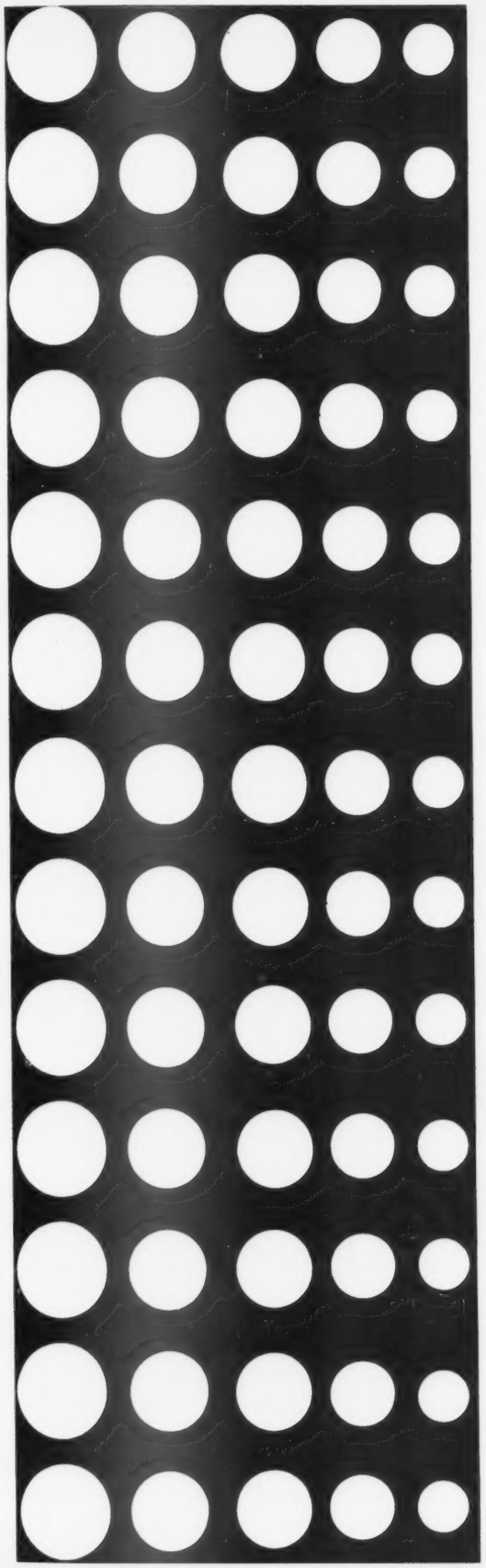
The process also makes available to architects and builders a beautiful and vibrant new facing material. Granite is studded with minerals like feldspar, quartz, mica and biotite, ranging in hues from clear crystal through pink, red, gray, black and white. Passing the rocket-jet flame over granite causes controlled spalling of the granite surface splitting feldspar and quart crystals along natural cleavage lines. Because of the crystalline nature of granite, surfaces produced by this method are not glassy smooth. Instead the process produces a pattern of interesting highlights, shadows, and smooth reflectant areas, creating an unusual, ever-changing visual effect. Besides being decorative and dramatic, the surface is practically impervious to all natural elements and will stay cleaner than most wrought materials. (The crush-resistant strength of granite is four times as great as good concrete. Granite is as hard as glass and possesses surface qualities that are actually similar to glass.)

Reducing cost of stone

Besides its ability to impart a beautiful finish on granite, the process is considered to have far reaching economic aspects. Because of its attractiveness, exceptional physical properties, and availability, granite was for many centuries, the popular choice for structures ranging from Cleopatra's Needle to modern shopping centers in New York, Minneapolis and San Francisco. But as material and labor costs rose, granite's popularity as a construction material fell. Now with the new process, the cost of granite facing material can be cut sharply. With mechanical processes the slab being worked must be thick enough to withstand the stress and shock of pneumatically-powered tools. However, flame does not exert a "bearing down" force on stone, so it is possible to use stone-shaping torches to shape and texture slabs as thin as ⅝ of an inch. When a 3 or 4-inch thick slab is wire sawn into thinner pieces, very dull, rough surfaces are produced by the sawing. Saw marks can be erased easily and quickly with the torch giving three or four times the useful surface from the same weight of stone. Surface appearance is considered superb, and this thin stone is excellent for veneer work. The use of 75 per cent thinner granite means a 75 per cent reduction in the total weight and area of granite needed to surface a building. Reduction of total weight also results in tremendous savings in freight and transportation costs.

Principle of operation

The patented torch burns oxygen and kerosene in an internal, water-cooled, rocket chamber. The resulting flame is emitted from a convergent-divergent nozzle at a velocity of 7,000 feet per second and a temperature of 5,500°F. This combination of intense heat and high velocity causes stone to spall. Cooling water for the combustion chamber exits through the front end of the burner and serves a two-fold purpose: (1) by positioning the water stream on one side of the spalling path, the stone on that side is protected from the flame and will not spall; (2) the water stream prevents the stone from overheating, eliminating the possibility of thermal cracking. The size of the jet flame is controlled by a fuel control valve on the front end of the torch. A reduction in the fuel ratio produces a smaller and sharper jet flame for more precise stone removal.



CLAY MASONRY AND AIR-CONDITIONING

by James G. Gross, P.E.*

The growing trend toward air-conditioning has wrought major changes in building design and construction during the past decade. The external and internal appearance of buildings has been vitally affected. At the same time the growing complexity of mechanical equipment has drawn architect and engineer closer together in successfully meeting these problems.

The characteristic of clay masonry most favorable to its inclusion in building for air-conditioning is its ability to resist heat transmission. However, it has many other abilities and applications, including use in cooling towers, equipment screens, shading devices such as solar screens, and even floors.

In designing for air-conditioning, heat transmission of walls is of primary importance, providing much of the basis on which heating and cooling loads can be calculated. Good design can result in heating and cooling load reductions of 50 per cent or more. This means substantially reduced initial and operating costs of heating and cooling units.

The clay masonry cavity wall is perhaps the best adapted of all masonry walls to air-conditioning. A 10-inch insulated cavity wall has a "U" value of about .12, compared with .30 for conventional masonry. The cavity wall is two wythes, or widths, of brick separated by a relatively narrow air space. The wythes of brick are tied together at intervals with metal ties. The most frequently used cavity wall type is four inches of brick, a two-inch air cavity, and four inches of brick or hollow masonry.

The cavity is both a thermal and water barrier, and can be insulated rather easily with water-repellent vermiculite, which has been found fully satisfactory for this purpose.

Here is an example of insulated cavity wall thermal efficiency. With outside design temperature at zero degrees, inside temperature at 65 degrees, and the annual winter degree days at 5,000, the annual heat loss through one square foot of insulated cavity wall is about 15,000 BTUs. Through the uninsulated cavity wall it is about 35,000 BTU's. (By current calculation methods the heat loss through metal panel or wood frame walls with the same "U" values would be the same. Tests, however, indicate that even for normal winter conditions less heat loss is experienced through denser walls than through lightweight construction of the same "U" values. This is due to fluctuating heat flow caused by varying weather. The extent to which capacity insulation affects heat loss must await further study.)

Thermal storage capacity

Thermal storage capacity is a function of the mass, density, and specific heat of materials. A lightweight wall permits quick transfer of heat; heavier walls retain heat for several hours before dissipating it. The measure of thermal storage capacity is "time lag." The "time lag" of typical masonry wall construction is from four to six hours, while that of wood frame and metal panel is from one to one-and-one half hours. At what time maximum thermal load will occur will depend upon plan arrangement, orientation, ratio of length to width, degree of shading, winds, ratio of roof to wall area, and the percentage and location of openings as well as to the type of wall construction.

The following heat gain table was computed on the basis of a typical design time of 4 p.m., the standard air-conditioning day of August 1, with an average orientation at 40 degrees north latitude and 15 degrees F temperature differential.

Wall	Color	Wt. psf	"U"	BTUs/Hr.
10" brick & tile cavity	Medium	65#	.29	3.0
10" brick & tile cavity, insulated	Medium	65#	.12	1.2
Wood frame, insulated	Medium	16#	.12	2.6
Metal panel, insulated	Medium	16#	.12	2.6
Double plate glass	Clear	7#	.55	60.0
Single plate glass	Clear	4#	1.13	74.0

Note that heavier walls have approximately half the heat gain of lightweight walls, despite identical "U" values. Values are based on average colors. Darker colors absorb more heat than lighter colors, with consequent higher "U" values.

Factors in cost

The initial cost of air-conditioning generally ranges from $600 to $1,800 per ton, or 5 to 15 cents per BTU of plant capacity. Some walls, in buildings with average orientation, have initial air-conditioning costs attributable to them of $700 per 100 sq. ft. beyond that of a typical insulated cavity wall. To this further must be added plant operation and maintenance in order to compute an ultimate cost.

Orientation and building shape are important influences on air-conditioning load. A wide shallow building may cost less to cool than a square one, given proper orientation. The use of solid masonry walls on the west or southwest will generally reduce the peak cooling load by a substantial amount. Using the same conditions previously described for average orientation, but considering a west orientation only, the heat gain through some walls is shown in the following table to be much higher than for average orientation.

Heat Gain (West Orientation)

Wall	Color	Wt. psf	"U"	BTUs/Hr.
10" brick & tile cavity	Medium	65#	.29	2.5
10" brick & tile cavity, insulated	Medium	65#	.12	1.0
Wood frame, insulated	Medium	16#	.12	4.1
Metal panel, insulated	Medium	16#	.12	4.1
Double plate glass	Clear	7#	.55	173.0
Single plate glass	Clear	4#	1.13	205.0

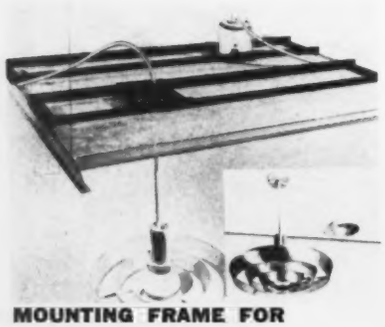
At 4 p.m., the gain may be 200 times as much as that through an insulated cavity wall. The additional initial cooling plant cost to accommodate this gain might amount to $20 per square foot.

Because of the low heat gain through masonry, its judicious use may permit building shapes and orientations—desired for reasons other than heat gain considerations—which building economics would not permit if materials were used which would pass larger amounts of heat into the building.

Mr. Gross is a registered professional engineer and Assistant Director of Engineering and Technology of the Structural Clay Products Institute, Washington, D. C. Gross also organizes and participates in engineering and technology seminars on clay masonry construction which SCPI periodically presents to practicing architects and engineers.

PRODUCTS, EQUIPMENT, MATERIALS

Report of recent developments by industry, based on data furnished by mfrs. Inquiry cards for further information face pages 1 and 56.



MOUNTING FRAME FOR SUSPENDED CEILINGS

MFR'S DESCRIPTION: mounting frame specifically designed for suspended ceilings, recessed or surface mounted lighting fixtures and/or sound control equipment.

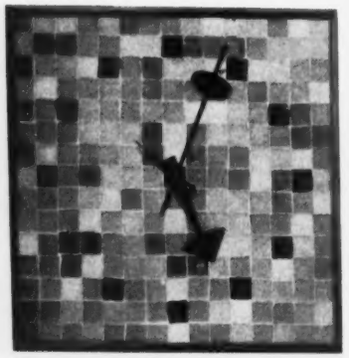
USES: residential and commercial interiors.

SPECS/FEATURES: mounting is stated to be suitable with any type suspended ceiling and all rail spacing. It offers complete interior lighting flexibility since the frame can be located in any desired position and used with any desired fixture. It eliminates the need for improvised light-hanging devices and drastically cuts installation time—no tools needed. Mounting frame is snapped onto ceiling rail. Inner frame slides to desired location and locks in place. Frame is then ready to receive fixture.

AIA FILE NO. 31-F-290

MFR: BELMAR LIGHTING CO.

Circle 200 for further information



ADDITION TO CLOCK LINE

MFR'S DESCRIPTION: line of highly styled clock-slave systems.

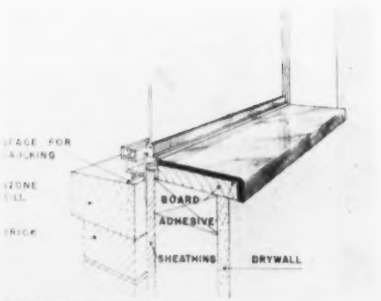
USES: institutional installations.

SPECS/FEATURES: mfr stresses attractive and unusual designs for key public areas. Designed by George Nelson, clocks incorporate wide variety of materials, color and scale in their construction. Clocks are available with secondary units and programming systems accuracy-regulated by Minneapolis Honeywell's master clock for use in hospitals, schools, banks, and offices.

AIA FILE NO. 31-i-24

MFR: HOWARD MILLER CLOCK CO.

Circle 201 for further information



MARBLEIZED FIBREGLASS WINDOW SILL

MFR'S DESCRIPTION: reported to be a low-cost, maintenance-free window stool to be used with metal windows, *Glassill* is being produced with the appearance of marble.

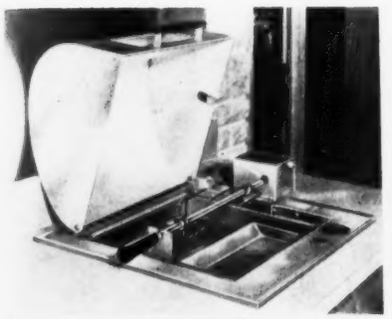
USES: new and old residences and on commercial buildings. Can also be applied as a jamb liner to eliminate wood trim and plaster returns. Other uses include use as a back splash on kitchen counter tops, etc.

SPECS/FEATURES: budget economy stressed. Product stated to resist all household stains, including cigarette burns and never requires painting. A formulation of glass fiber, sill can be cut with a hacksaw or abrasive disc, and is installed with an adhesive. Made in 9′ lengths and in two widths, 4½″ and 5¼″. Presently made in grey marble color only, it will soon be available in brown marble.

AIA FILE NO. 35-P

MFR: THE GLASSILL CO.

Circle 202 for further information



BUILT-IN BARBECUE FITS STANDARD UNITS

MFR'S DESCRIPTION: built-in barbecue unit fits into standard kitchen counters. Fully-insulated unit stated to introduce advancements in barbecue cookery as two-piece grids are channeled and slanted so that melted fat flows away from the heat through a built-in grease funnel to a removable, anodized aluminum grease container.

USES: residential kitchens.

SPECS/FEATURES: drops into 19⅞″ by 19⅜″ cutout with no break in cabinet line. Removable, stainless steel-lined side panels and aluminum mesh shield in bottom reflects heat and prevents flare-ups. Various models with various features available.

AIA FILE NO. 35-C-1

MFR: NUTONE, INC.

Circle 203 for further information

CERAMICS/GLASS

CERAMIC TILE WALL SHEETS

MFR'S DESCRIPTION: sheets of twelve 4¼" square ceramic wall tiles.
USES: residential and commercial applications.
SPECS/FEATURES: tile is mounted on strong treated and twisted paper mesh and bonded to tile by special cement. Mfr states that sheets won't buckle in handling and that 70 per cent of tile surface comes in contact with mortar, mastic, or mortar mix. Soaking not necessary. Mesh can be cut with trowel. Irregularities in wall surfaces can be compensated for. Mfr stresses savings in installation time and labor costs. Sheets come in 4' x 3' tiles to fit most dimensions with a minimum of cutting.
AIA FILE NO. 23-A
MFR: STYLON CORP.
Circle 204 for further information

GREEN HOLLOW GLASS TILE ADDITION

MFR'S DESCRIPTION: a soft shade of green, hollow glass tile panels have been added to the *Thinlite Curtain Wall System.*
USES: curtain wall glazing for commercial and institutional installations.
SPECS/FEATURES: color is actually in the glass, a process developed by mfr, which permits both green glass and colorless glass to be drawn from the same glass furnace at the same time. Thus the green "*Vista*" (transparent glass) panels and green prismatic, solar-selecting panels, with color actually a part of the glass itself, are now available for the first time. Basic panels (part of *Thinlite System*) are 2' high and either 4' or 5' feet wide. Hollow, 2" thick glass tiles in panels come in patterns either 12" square or 6" x 12". New units in green color available at no increase in price.
AIA FILE NO. 23-K
MFR: KIMBLE GLASS CO., SUBSIDIARY OF OWENS-ILLINOIS
Circle 205 for further information

LIGHTING UNITS

WEATHERTIGHT ALUMINUM WALL BRACKET

MFR'S DESCRIPTION: the *4-75 Line* introduced featuring contemporary design in weather-resisting exterior brackets.
USES: institutional and commercial building projects.
SPECS/FEATURES: suited for mounting in either horizontal or vertical positions, over doorways or adjacent to entrance-ways. Fixture can also be mounted under canopies, marquees, overhangs and covered walkways. Features all cast aluminum construction with hinged door frame containing impact resisting heavy molded white glass diffuser, wiring for either two 100 watt incandescent lamps, or two 15 watt fluorescent lamps and 4" cast aluminum junction box, gasket and machine screws for weathertight installation. Satin anodized aluminum finish.
AIA FILE NO. 31-F-2
MFR: MCPHILBEN LIGHTING, INC.
Circle 206 for further information

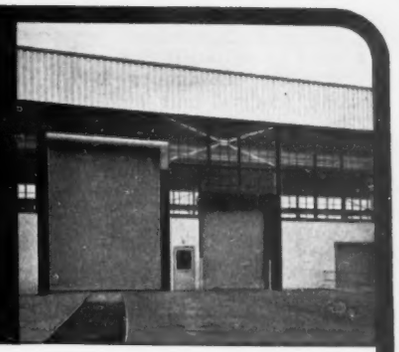
FLOODLIGHT PROJECTS BAND OF LIGHT

MFR'S DESCRIPTION: *Wide-Light Lumitor* floodlight provides a vertical beam spread of only 8°, and a horizontal beam spread of 100°, opening up floodlighting possibilities that haven't existed with previous round or oval light pattern floodlights.
USES: applications include decorative lighting of tall buildings from near base of the wall, and lighting for stadiums, golf driving ranges, signs, billboards, airport runways, and marine uses.
SPECS/FEATURES: utilizes a 2,000 hour-rated quartz-iodine lamp providing a mean efficiency of 22 lumens throughout lamp life as compared with ordinary incandescent lamp efficiency of 14.5 lumens per watt. Aiming device permits accurate aiming of light's beam pattern. Quart-iodine lamp must be operated within 4° of horizontal, so level is built into housing. Available in 500 and 1,500-watt models. Cast aluminum body with deep cooling fins, stainless steel screws and ¼" tempered glass lens.
AIA FILE NO. 31-F-22
MFR: WIDE-LITE CORP.
Circle 207 for further information

THERMOELECTRICALLY COOLED FLUORESCENTS

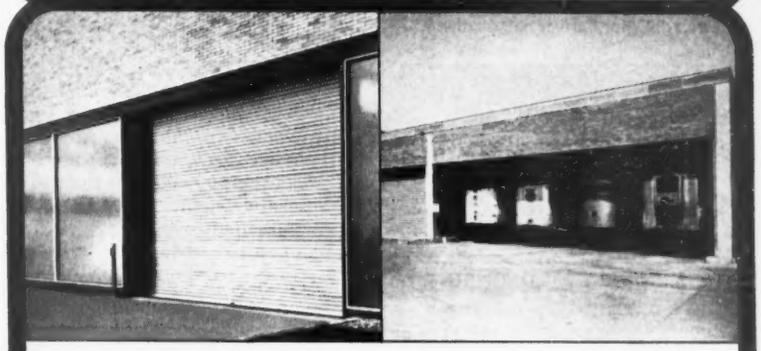
MFR'S DESCRIPTION: thermoelectrically cooled fluorescent luminaires achieve maximum light output over a wide range of temperatures.
USES: all areas of outdoor lighting.
SPECS/FEATURES: at 77° F ambient temperature, light output of cooled luminaire is 72 per cent higher than an identical luminaire without thermoelectric device. Light output is nearly constant throughout an ambient temperature range of below 0° F to above 77° F. Because cooled luminaire provides constant light output, illumination engineers need not compensate for temperature effects on luminaire efficiency when planning a fluorescent installation. Used with any high output lamp, device inside fixture automatically adjusts to differing lamp bulb

MAHON ROLLING STEEL DOORS



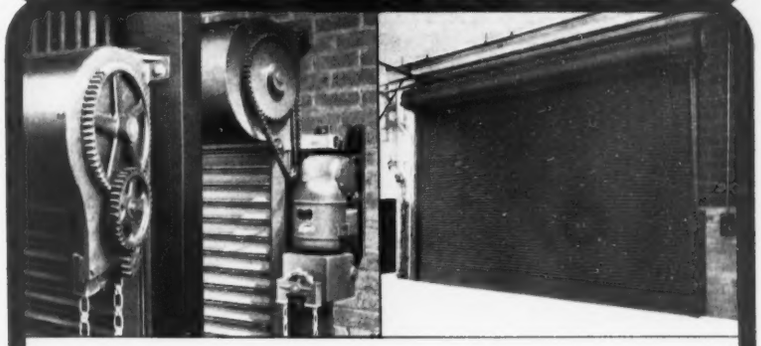
. . versatile space-savers, efficient cost-cutters that . . .

. . fit any opening, any application, any type installation . . .



. . suit any surroundings—industrial, commercial or institutional . . .

. . work with a quick vertical roll-up action, and out-of-the-way storage . . .



. . easy operation in either mechanical- or power-operated types . . .

. . in standard or special models, plus Underwriters' labeled types . . .

. . . quality made with Bonderized curtain slats for long life . . .
. . . completely described in Catalog G-60. Write for it or See Sweet's File.

other Mahon building products— Curtain Wall, M-Floors, Long-Span M-Deck, Steel Roof Deck. Acoustical Metal Walls.

Mahon construction services— Structural Steel—Fabrication and Erection; Steel Fabrication—Weldments and Assembly.

THE R. C. MAHON COMPANY
Detroit 34, Michigan
Manufacturing Plants—Detroit and Torrance, Calif.
Sales-Engineering Offices in Detroit, New York, Chicago, Torrance and San Francisco.
Representatives in all principal cities.

MAHON
Circle 108 for further information

diameters. Luminaire is 6′, four-lamp, shallow unit employing four Peltier thermoelectric heat pumps for spot-cooling the fluorescent lamps. In the heat pump direct current flows through junctions of dissimilar metals, absorbing heat in one junction and liberating heat in other. Cold junction constants approximately one-half sq. in. on lamp bulb wall, thereby maintaining mercury vapor pressure within lamp at optimum value for maximum light output.
AIA FILE NO. 31-F-2
MFR: LINE MATERIAL INDUSTRIES, MCGRAW-EDISON CO.
Circle 208 for further information

HIGH-LEVEL FLUORESCENT LUMINAIRE

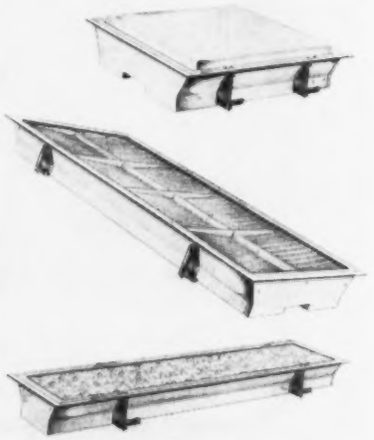
MFR'S DESCRIPTION: the *Trend Series* fluorescent luminaires are announced as providing high-level illumination at recommended standards for visual comfort.
USES: designed especially for schools and offices.
SPECS/FEATURES: design of unit includes completely luminous wrap-around side panels. Together with diffusers unit is stated to provide higher foot-candle level than available from conventional fixtures. Choice of three diffusers offered. Unit is considered moderately-priced and uses 430-ma rapid-start lamps. Two-lamp, three-lamp and four-lamp units are offered in 4′ lengths. Also offered is a 4-lamp, 8′ tandem luminaire arrangement.
AIA FILE NO. 31-F-2
MFR: LIGHTING PRODUCTS, INC.
Circle 209 for further information

DAYLIGHTING DESIGN TOOL

MFR'S DESCRIPTION: adaptation of slide-rule principle in *Daylighting Calculator*.
USES: daylighting design for architects and engineers.
SPECS/FEATURES: calculating tool takes into account all variables that affect daylighting design; floor area, ceiling height, interior finish, windows, visual task, roof well depth, and climate. Indicates exact size, number, type and spacing of mfr's skylights for required illumination level and lighting dispersion. Calculator translates into linear logarithms most of final computations developed by mfr.
AIA FILE NO. 35-H-4
MFR: WASCO PRODUCTS, INC.
Circle 210 for further information

EXPLOSION-PROOF FIXTURE HANGER

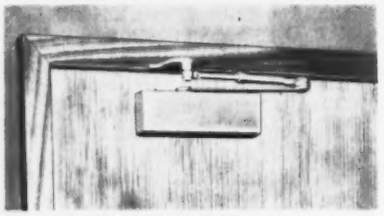
MER'S DESCRIPTION: the *EFHC* explosion proof fixture hanger is announced for use with suspending fluorescent or incandescent explosion-proof or dust-tight pendent lighting fixtures.
USES: in hospitals or other institutional or industrial applications requiring equipment safety.
SPECS/FEATURES: round body design having threaded feed-thru hubs. Threaded hub leading from bottom of fixture stem is tapped and has a set screw to insure against conduit loosening. Wiring connections are easily made by simply removing threaded cover exposing large wiring chamber. Available with ¾″ and 1″ feed-thru hubs in combination with ½″, ¾″, and 1″ fixture stem hubs. Unit has U.L. approval for Class I, Groups C and D, and Class II, Groups E, F, and G.
AIA FILE NO. 31-D
MFR: APPLETON ELECTRIC CO.
Circle 211 for further information



RECESSED SHALLOW LINE TROFFERS

MFR'S DESCRIPTION: a line of recessed fluorescent troffers called *Shallow Line*, featuring wide variety of diffusing elements and an over-all depth of only 4⅞″ is stated to provide greater structural freedom between floors by allowing plenum depth to be reduced.
USES: commercial and institutional installations.
SPECS/FEATURES: overhead yokes have been eliminated in favor of a rapid installating swivel-bar mechanism. Housings are fabricated and wired in a one-piece unit. Other features of troffers include one-piece diffusing elements (up to 8 sq. ft. of glass, lens or lower) unmarred by cross members and support bars. Hinging has been simplified, eliminating screws. Available for all popular ceiling types. The 14 basic types of shield elements include those of major mfrs.
AIA FILE NO. 31-F-2
MFR: BENJAMIN DIV., THOMAS INDUSTRIES INC.
Circle 212 for further information

DOOR/WINDOW UNITS



SURFACE MOUNTED DOOR CLOSERS

MFR'S DESCRIPTION: full rack-and-pinion hydraulic operating closer.
USES: interior and exterior installations on wood or metal doors.
SPECS/FEATURES: series *7000* closer is contained in aluminum shell and is enclosed with removable steel cover that can be painted to match building decor. Closer projects less than 2″ from surface of decor and is available with regular arms, parallel arms, holder arms, or fusible link holder arms for either right or left-hand doors. Dual control permits wide range of regulation for both closing and latch speeds.
AIA FILE NO. 27-C
MFR: NORTON DOOR CLOSER CO., DIV. THE YALE & TOWNE MANUFACTURING CO.
Circle 213 for further information

LEAD STRIPPING FOR WINDOWS

MFR'S DESCRIPTION: flexible lead strips permanently bondable to glass.
USES: residential, religious, and commercial buildings.
SPECS/FEATURES: *Decra-Led* strips are applied to any pattern traced on window. Special adhesive is brushed on and strip is guided along pattern line. Boning tool provided to press lead making it permanently airtight and waterproof. Mfr stresses ease of cleaning since strips taper to glass without grooves. Offered in window kits, pictorial design kits, and in individual coil with stripping of various widths. Mfr cites savings of 60 to 90 per cent over conventional leaded glass.
AIA FILE NO. 26-A-7
MFR: CRAFTWOOD CORP.
Circle 214 for further information

EASY SETTING COMPACT DOOR CONTROL

MFR'S DESCRIPTION: a double-action door control that is easily installed in the transom bar of interior or exterior doors.
USES: built for heavy commercial duty installations.
SPECS/FEATURES: center-pivoted door control compactly designed so that it slips inside standard 2″ x 4″ overhead tube on a door. Installation time sharply reduced and expensive setting of conventional bottom closures is eliminated. Control has automatic speed adjustment that provides correct rate of action for any traffic pattern. Action is reversible and unit may be used for either right or left openings.
AIA FILE NO. 27-B
MFR: C. R. LAURENCE CO.
Circle 215 for further information

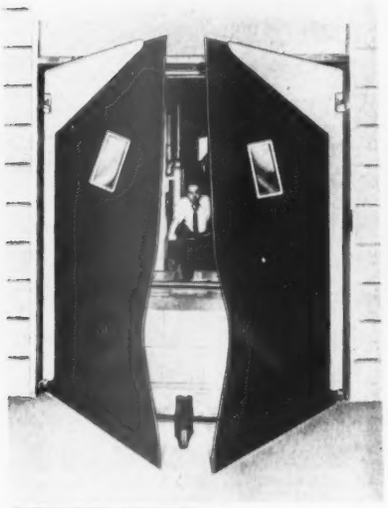
WRAP-AROUND WINDOW FORM

MFR'S DESCRIPTION: cased window opening of durable primed steel.
USES: any standard size basement window.
SPECS/FEATURES: available in three standard basement window sizes to fit poured concrete or block wall thicknesses of 7-⅝″, 8″, 9″, 9-⅝″, or 10″. Forms are shipped flat, saving freight costs and warehouse space. One stock or supply of standard basement window is all that is needed for basement window open-

ings with or without integral window forms.
AIA FILE NO. 16-L
MFR: ROLITE MFG. CO.
Circle 216 for further information

VINYL-CLAD STEEL WINDOW

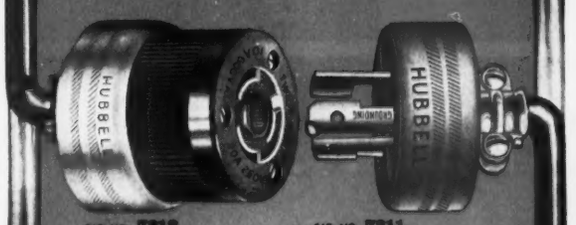
MFR'S DESCRIPTION: line of weathertight, permanently colored, non-corrosive windows imported from Germany.
USES: monumental buildings
SPECS/FEATURES: ⅛" vinyl covering forms durable shell over tubular steel skeleton. Window is available in three styles most suitable for monumental buildings; permitting use of single-strength, double-strength, or insulating glass. Plastic cover provides permanent insulating and sound deadening barrier. Three separate vinyl seals built into window perimeter prevent passage of air and sound, reducing both heating and air-conditioning costs and making interiors more quiet and comfortable, mfr states. Non-fade colors are added to plastic in liquid stage, insuring uniform and permanent colors which will not scratch, chip, or fade.
AIA FILE NO. 16-A
MFR: FENESTRA, INC.
Circle 217 for further information



DOUBLE SWING RUBBER DOORS

MFR'S DESCRIPTION: flexible two-ply rubber doors which give on impact.
USES: industrial and commercial applications.
SPECS/FEATURES: hand trucks, fork lift trucks, power trucks of all kinds are stated to be able to pass through doors without harm to trucks, goods or doors. Equipped with double-acting gravity V-cam hinges requiring little or no maintenance or adjustment. No. 11 ga. double steel

ONLY
HUBBELL
MAKES RUGGED
Twist-Lock®



CAT. NO. 7313
3-WIRE CONNECTOR BODY
30 AMPS., 250 VOLTS, A.C. OR D.C.
10 AMPS., 600 VOLTS, A.C.

CAT. NO. 7311
3-WIRE CAP
30 AMPS., 250 VOLTS, A.C. OR D.C.
10 AMPS., 600 VOLTS, A.C.

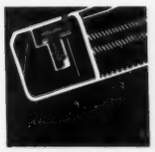
"Twist-Lock" provides greater convenience, safety and efficiency in the operation of motor driven tools and other portable electrical equipment. Types, sizes and ratings to fit every industrial application. For complete information, see Hubbell catalog #29 or Sweet's File 31b/Hu.

"Twist-Lock" offers many wiring features which simplify installation, eliminate costly service call-backs and provide dependable, trouble-free life. The following are standard features of all regular "Twist-Lock" units.

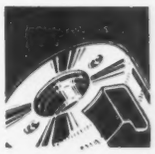
Heavy Duty Construction
SOLID BRASS MOLDED-IN INSERTS HOLD CONNECTOR BODY TOGETHER SECURELY

"Speed-Easy" Wiring Convenience
HEAVIER SCREWS LARGER BINDING HEADS TERMINALS RECESSED IN CAP FOR EXTRA WIRING ROOM

Trouble-Free Wiring
UPSET BINDING SCREWS CAN'T COME OUT!



Armor Plate Protection
RUGGED STEEL ARMOR PLATE SHELL FOR MAXIMUM PROTECTION AGAINST BREAKAGE



"Bed-Rock" Blade Stability
BLADES SOLIDLY ANCHORED WITH MOLDED-IN KNURLED RIVETS LARGER SPUN-OVER AREA

Adjustable Cord Grip
HEAVY ADJUSTABLE CORD GRIPS TAKE STRAIN FROM BINDING SCREWS

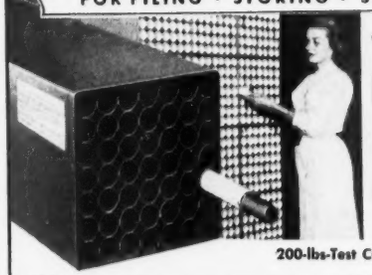
Twist-Lock is a registered trademark of Harvey Hubbell, Incorporated

HARVEY
HUBBELL
INCORPORATED
BRIDGEPORT 2, CONNECTICUT
In Canada: Scarborough, Ontario

IT PAYS TO HAVE HUBBELL GOOD CONNECTIONS

Circle 109 for further information

MULTIROLL FILES
FOR FILING · STORING · SEGREGATING



TRACINGS
BLUE PRINTS
SHEET
MATERIAL

FILE CONSTRUCTED IN
200-lbs-Test CORRUGATED CONTAINER

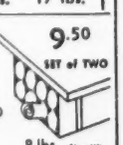
Depth	11¼"	22¼"	30½"	36½"	42¼"
49 Tube Model 1¾" I.D.	49AB $7.50	49CD $9.50	4930 $12.80	4936 $13.80	4942 $14.80
25 Tube Model 2¼" I.D.	25AB $7.00	25CD $9.00	2530 $11.80	2536 $12.80	2542 $13.80
	Shipping Weight				
Model 49	8 lbs.	12 lbs.	15 lbs.	18 lbs.	20 lbs.
Model 25	6 lbs.	10 lbs.	13 lbs.	15 lbs.	17 lbs.

Sold in Sets Only—
2 JR36 Per Set

ENAMELED MED. GRAY

JR 36

DESIGNED TO MOUNT UNDER BOARD MOUNTING BRACKETS FURNISHED.



9.50
SET of TWO
8 lbs. Shp. Wt.

F.O.B. St. Clair Shores, Mich. • PRescott 3-2515 • SOLD DIRECT ONLY
Write to Dept. B-2

ROLL & FILE SYSTEMS, INC. - P.O. BOX 3863, DETROIT 5, MICH.

Circle 110 for further information

FULL INFORMATION ON THE TWO MOST-SPECIFIED* HARDWOOD FLOORS

permaCushion†
Free-Floating Resilient Floor System

Ironbound®
Continuous Strip® Hard Maple Floor

*called for "by name" more than any other hardwood floors

yours free!

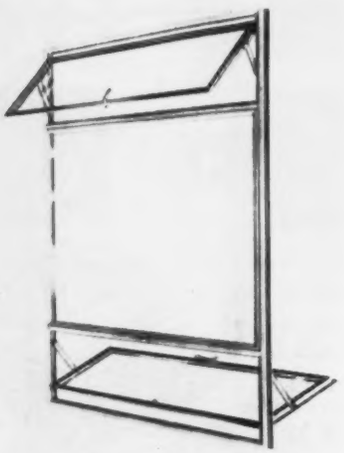
Write today to Robbins Flooring Co., Reed City, Mich., Dept. AEN-860

†Patented and Trademarked in U. S. and Canada.

ROBBINS FLOORING COMPANY
Reed City and Ishpeming, Michigan
WORLD'S LARGEST MANUFACTURER OF MAPLE FLOORING

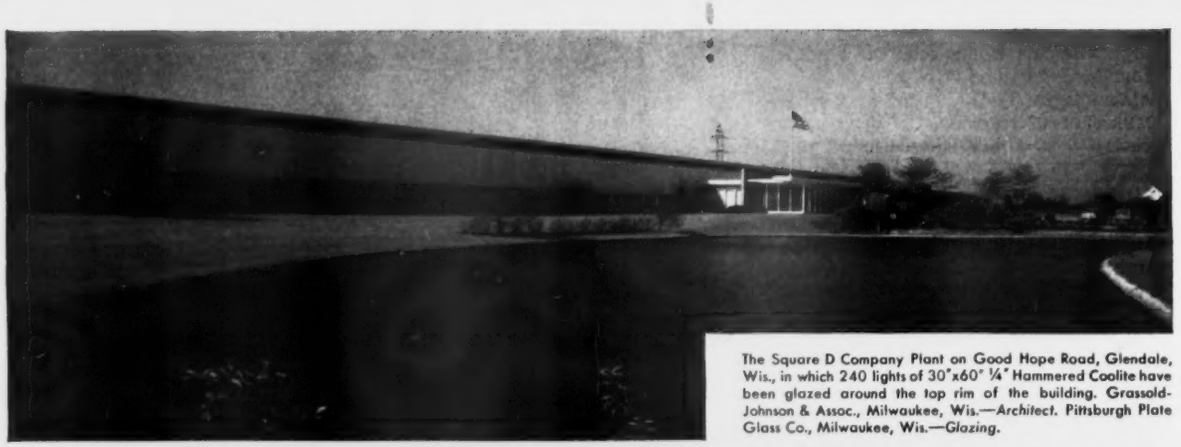
Circle 111 for further information

frame. Plexiglas vision windows. *Flex-A-Matic* Doors can be fabricated to fit any size opening. Furnished with air seal, and if desired, stay open hinges and magnet closure.
AIA FILE NO. 16-M-1
MFR: THE PEELE CO.
Circle 218 for further information



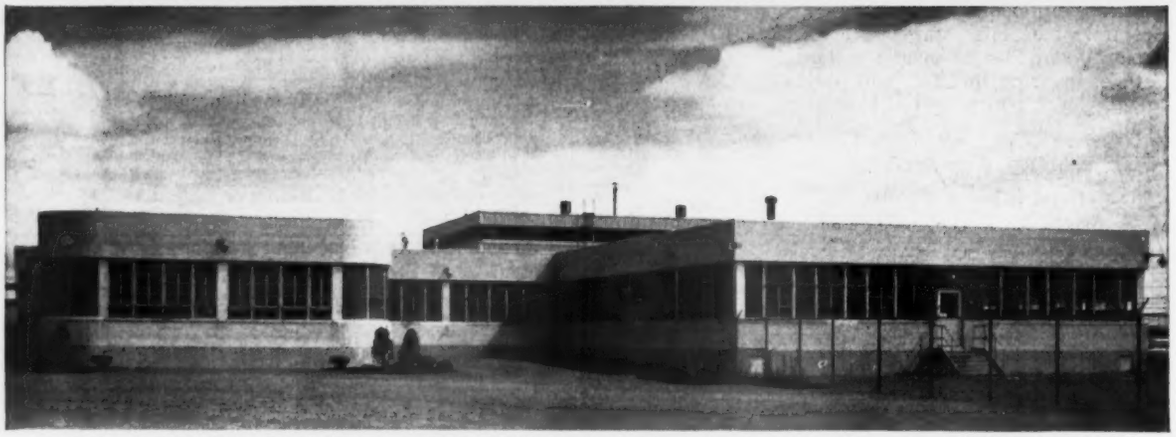
WINDOWS FOR AIR CONDITIONED BUILDINGS

MFR'S DESCRIPTION: aluminum vertically pivoted window designed for use in air-conditioned buildings.
USES: commercial and industrial applications.
SPECS/FEATURES: designated series *55-A*, window features full 360° rotation, and is fitted with automatic locking mechanism to hold window in reverse position for cleaning. Window can be used as self-contained unit, or vents can be added. Window is designed to accommodate down-and-out transom or up-and-in hopper vent using same outside pivoted frame section around entire unit. Other construction details include double weatherstripping with closed-cell sponge *Neoprene* around entire perimeter of vent, and glazing bead at sill which is designed to catch any condensation and to prevent runoff to building interior. Hardware is white bronze and stainless steel. Transom unit and hopper vent, both double weatherstripped, are available with either solid or tubular sections. Width of 5'0 and height of 7'0 are maximum recommended dimensions using ½" thick insulating glass.
AIA FILE NO. 16-L
MFR: REPUBLIC STEEL CORP.
Circle 219 for further information

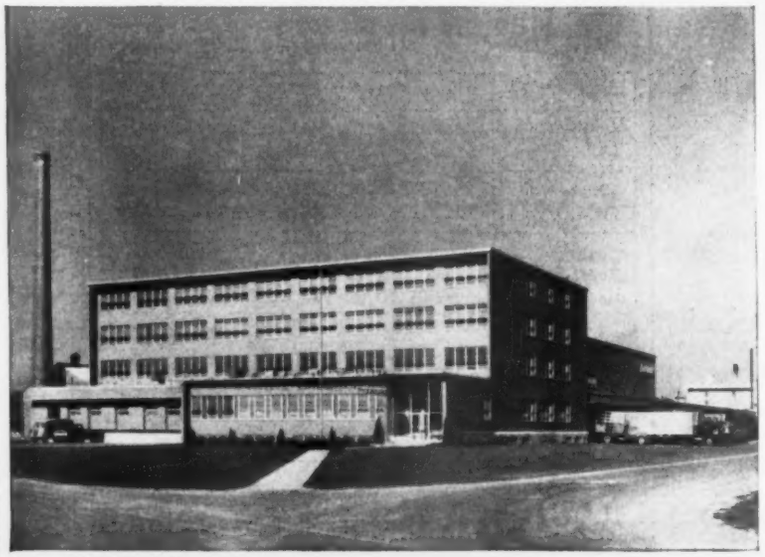


The Square D Company Plant on Good Hope Road, Glendale, Wis., in which 240 lights of 30"x60" ¼" Hammered Coolite have been glazed around the top rim of the building. Grassold-Johnson & Assoc., Milwaukee, Wis.—*Architect.* Pittsburgh Plate Glass Co., Milwaukee, Wis.—*Glazing.*

MISSISSIPPI GLASS . . .



Speer Carbon Company, Niagara Falls, N. Y. Laboratory glazed with ⅛" Luxlite Coolite, Glare Reduced One Side. Pilot house glazed with ¼" Luxlite Coolite Wire Glass. Otto Preis, New York, N. Y.—*Architect.* Walter J. Johnson, Niagara Falls, N. Y.—*Contractor.* United Glazing Company, Buffalo, N. Y.—*Glazing Contractor.*



Borden Foods Company, Plymouth, Wis. South, east, and west elevations glazed with ⅛" Mississippi Luxlite Coolite, Heat Absorbing Glass. Cowell & Robinson, New York, N. Y.,—*Architects-Engineers.* McDonough Construction Company of Georgia—*Contractors.*

SEE OUR CATALOG IN SWEETS OR WRITE FOR COPY

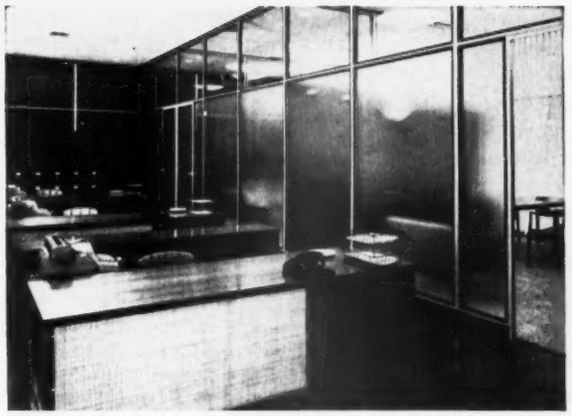
WORLD'S LARGEST

Circle 112 for further information

I. B. M. Electric Typewriter Plant, Lexington, Kentucky, where 35,000 sq. ft. of ¼" Luxlite Coolite, Glare Reduced, is installed. Fordyce & Hamby, Associates—*Architecture and Engineering*. Gilbane Construction Company—*General Contractor*. Pittsburgh Plate Glass Company, Lexington, Kentucky—*Glass and Glazing*.

. . . IN *Better* BUILDINGS EVERYWHERE

Pace setter in building progress, Mississippi glass helps achieve the ultimate in natural lighting . . . promotes truly functional architecture adapted to today's needs . . . offers a new dramatic texture that enhances the appearance of any structure. That's why today's leading architects are taking fullest advantage of translucent glass. Their outstanding buildings enjoy more and better daylighting per glazing dollar because translucent glass diffuses daylight deep into interiors to achieve even, comfortable, over-all illumination at low cost, and translucent glass helps create a feeling of spaciousness and comfort with resultant efficiencies and improved morale. For utility, beauty, and variety unmatched by any other glazing medium, specify Mississippi glass. Available in an exciting selection of patterns, wired and unwired, at better distributors everywhere.



Partitions of 7/32" Mississippi Factrolite Glass in Mutual Insurance Company of Hartford. Interior by Associated Designers for Interiors, Inc.

Write for new 1960 catalog. Address Department 18.

MISSISSIPPI GLASS COMPANY

NEW YORK • CHICAGO • FULLERTON, CALIFORNIA

88 Angelica Street • St. Louis 7, Missouri

MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

Circle 112 for further information

PRODUCTS, EQUIPMENT, MATERIALS

SECTIONAL OVERHEAD DOORS

MFR'S DESCRIPTION: line of overhead doors in wide range of styles and sizes.

USES: residential, commercial, and industrial applications.

SPECS/FEATURES: mfr stresses design of vertical track angled away from jambs; as door closes it automatically fits tightly against jambs and is held there providing protection against weather. Hinges, with graduated roller carriers, are oil lubricated and graduated in height to provide perfect opening and closing control; hinge brackets extend from door sections to track rollers. Door can be freed from jambs instantly and automatically. Extension lift springs match weight of door section for accurate balance. Springs are mounted alongside horizontal tracks for convenient installation and adjustment. Track rollers are grease packed and operate on ball bearings. On residential doors, aircraft cable is installed for quiet operation; rugged lift chains are used with industrial doors. Old growth Douglas fir is used; joints are mortised and tenoned, waterproof glued and steel pinned. Hardware is corrosion resistant and features aluminized finish. Panel moldings of various shapes are available. Sizes range from 8′ to 16′ in width, and from 6½′ to 14′ in height; larger sizes on special order.

AIA FILE NO. 16-A

MFR: BETTER-BILT DOOR CO.

Circle 220 for further information

HVAC

PACKAGED WATER COOLING TOWER

MFR'S DESCRIPTION: major advancements in the design of their packaged water-cooling tower, *Permatower*, have been announced.

USES: mechanical equipment installations.

SPECS/FEATURES: in redesigned unit, water distribution system has been changed to gravity-flow method. This method is standard equipment in all *Marley Double-Flow* type towers. An automatic bleed-off arrangement is included as standard equipment. Factory assembled units require only simple piping and wiring service connections in field. This line's capacities range from 5 tons to 80 tons and units are planned for maximum resistance to rust and corrosion in the cooling tower via waterproof

Bally **walk-ins**

Aluminum or steel sectional construction

Sanitary! Strong! Efficient! You can assemble any size cooler, freezer or combination in any shape from standard sections. Add sections to increase size as your requirements grow. Easy to disassemble for relocation.

Bally Case and Cooler, Inc., Bally, Pa.

Get details—write AN-8 for FREE book.

Circle 113 for further information

AERO-BOARD

Air Powered Hydraulic DOCKBOARDS

IN NEW Construction or Remodeling

CUSTOM ENGINEERING SERVICE AVAILABLE

Freightliner will Custom Engineer AERO-BOARDS to FIT your capacity requirements and installation specifications.

CHECK THESE ADVANTAGES:

Low Initial Cost • Inexpensive to Install and Operate • Stores Upright—out of the way • Manual-automatic-"Air-over-Oil" activated—from power supplied by air system standard on many docks • Safe—One Man Operation • No Electrical power required at dockboard • Standard, 10,000 lb. cap. model adaptable to most installations.

AERO-BOARD, ready to install.. $410.00

Write for your copy of the AERO-BOARD specification brochure. It includes detailed AERO-BOARD specifications, photos, installation diagrams, air compressor requirements, name of local supplier.

AERO-BOARDS are sold and serviced by Leading Materials Handling Equipment Distributors.

Mfd. by **FREIGHTLINER CORPORATION** Dept. 8B, Box 3591 Portland 8, Oregon

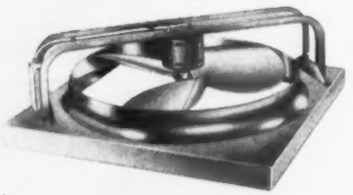
Circle 114 for further information

laminated wood panels with fiber-reinforced resin coating used for casing and basing. Inert, corrosion-proof material used extensively in unit; and all metal components are hot dip galvanized after fabrication.

AIA FILE NO. 17-B

MFR: THE MARLEY CO.

Circle 221 for further information



DIRECT DRIVE ATTIC FAN

MFR'S DESCRIPTION: electric 30" direct drive attic fan.

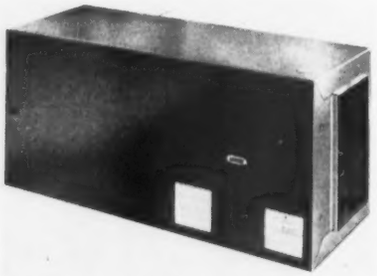
USES: residential and commercial applications.

SPECS/FEATURES: all belts and pulleys are eliminated through use of electric ¼ hp permanent split eight-pole motor. Designed to operate smoothly at 835 rpm, mfr stresses quiet operation. Other features include: full venturi to improve static pressure performance; protective baked enamel finish; sturdy steel plates; and extra large junction box. Ceiling shutters that open and close automatically with operation of fan are available for use with this unit. They feature special "flutter"-proof design, overlapping aluminum louvers mounted in formed steel frame, and fusible link. Entire shutter unit can be mounted in ceiling with no trim required. List price for fan is $69.90. Price for shutter is $19.60.

AIA FILE NO. 30-D-1

MFR: THE EMERSON ELECTRIC CO.

Circle 222 for further information



COMPACT FORCED-AIR ELECTRIC FURNACE

MFR'S DESCRIPTION: production is announced of a compact electric furnace which will have an output of 39,000 Btuh sufficient to heat the average house properly insulated for electric heating.

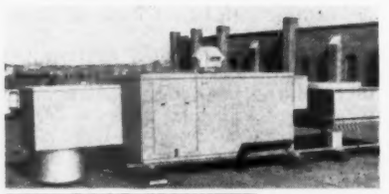
USES: central forced warm-air application.

SPECS/FEATURES: includes air circulation to prevent air stratification and staleness; provides air filtering; fresh air can be introduced into system; humidity can be controlled; air purifiers can be added. Blower is resiliently mounted and has ample capacity for additive cooling. Unit of *ES Series* can be installed as horizontal unit, an up-flow unit or a down-flow unit. Service can be accomplished from either side. Length: 42½", height: 19", and depth: 17"; "hammock" type filter is 18" x 24". Completely factory assembled and wired, unit has U.L. listing. Following are heating outputs with varing voltages: 208V-31,800 Btuh; 220V-35,700 Btuh; 230V-39,000 Btuh; 240V-42,500 Buth.

AIA FILE NO. 30

MFR: LENNOX INDUSTRIES INC.

Circle 223 for further information



LOW ROOF MOUNTED HEATING/COOLING UNITS

MFR'S DESCRIPTION: two low-silhouette combination air-cooled air-conditioner and gas fired heater packages for roof mounting have been introduced as *Typhoon RMU* units. Factory assembled package is designed to prevent unsightly roof clutter and yet offer building owners the economics of roof mounted heating and cooling equipment.

USES: installation for one-story commercial and industrial buildings.

SPECS/FEATURES: 43" high, units have cooling capacities of eight or ten tons and heating capacities of 160,000 or 240,000 Btu/hr output. Required field connections are electrical and has coupling condenser unit to the main package. AC system, filters, blowers, controls, and gas fired heater are housed together. Condenser may be mounted next to main unit or remotely on the roof. Cooled by a vertical discharge propeller fan, condenser is unaffected by wind velocity. Larger ten-ton model, including condenser weighs only 2,750 lbs. Lift-up drop out access panels for servicing. Total assembly is approx. 18' long and 5' wide. Other

installation details and application information available.
AIA NO. 17-B
MFR: TYPHOON AIR CONDITIONING DIV., HUPP CORP.
Circle 224 for further information

FIBERGLASS ROOF VENTILATOR

MFR'S DESCRIPTION: power roof ventilator with an all fiberglass housing has been introduced which is claimed to withstand even the intense heat of a grease fire virtually undamaged.
USES: restaurant ventilating and similar institutional purposes.
SPECS/FEATURES: mfr claims there is no danger of housing being melted and dropping the entire unit down through the roof. Unit called "*Fiber-Aire*," provides resistance to fumes, chemicals and impact, plus operating efficiency and quietness according to mfr. Unit available in direct axial and direct and belt-driven centrifugal models with capacities from 180 to 13,150 cfm.
AIA FILE NO. 12-K
MFR: SWARTWOUT FABRICATORS, INC.
Circle 225 for further information

LOW SILHOUETTE UNIT AIR-CONDITIONER

MFR'S DESCRIPTION: the *Low-Boy Airditioner* unit designed for year-round air-conditioning of multi-story buildings featuring floor-to-ceiling or low windows is considered by its mfr to be the answer to the architect's "prayer."
USES: air-conditioning equipment for high-rise structures.
SPECS/FEATURES: has low silhouette, which does not obstruct vision or light nor detract from building appearance. Normally installed free standing on the floor to provide drapery clearance behind the unit. Fan-coil unit, utilizing hot or chilled water as need dictates. Ducting, with subsequent reduction of floor build-up, an important cost-factor, is eliminated. Has individual room control. Unit design offers smooth, uninterrupted appearance free of screws, latches and nameplates and is available in six colors.
AIA FILE NO. 30-F
MFR: MODINE MANUFACTURING CO.
Circle 226 for further information

SIMPLIFIED INDIVIDUAL ROOM TEMPERATURE CONTROL

MFR'S DESCRIPTION: the *Sterlco Thermotrol* is claimed to provide an efficient, compact temperature control unit which can be installed on any radiator.
USES: primarily residential heating systems.
SPECS/FEATURES: unit is self-contained, requiring no connection to any external device, or power supply, and is easily installed as an ordinary radiator valve. It is not an "off-and-on" control, but modulates flow of steam or water to radiator to maintain a constant temperature within 1½°F. Setting may be adjusted by use of graduated dial to any point between 60° and 80°F. Dial may be locked to prevent tampering. Balance in system may be achieved by individual radiator adjustment. Literature available.
AIA FILE NO. 30-E
MFR: STERLING, INC.
Circle 227 for further information

PLASTICS

PLASTIC COMPOUND NON-SLIP COATING

MFR'S DESCRIPTION: *Abrasive Overlay* is being marketed as a heavy-bodied plastic compound with a wear-resisting mineral-type aggregate.
USES: designed for troweling over metal, wood, concrete, or mastic, to form a non-slip coating.
SPFCS/FEATURES: claimed to be 100 per cent non-slipping, wet or dry and highly resistant to water, gasoline, oil, alcohol, fats, grease and many acids. Product can be troweled over any clean, dry, solid floor surface, and sets hard enough for foot traffic in about 12 hours, truck traffic in 24 hours. No primer, sealer, or etching is required, even when applied on polished metal surfaces. Not a paint, but a veneer-like coating about 1/16" thick. Available in red, green, and light gray; special colors on request.
AIA FILE NO. 23-D
MFR: PARAMOUNT INDUSTRIAL PRODUCTS CO.
Circle 228 for further information

HIGH STRENGTH EPOXY ADHESIVES

MFR'S DESCRIPTION: three high strength two-component modified epoxy resin adhesives that cure at room temperature under contact pressure. *Scotch-Weld EC-1751.*
USES: high strength metal and plastic bonding applications where heat and/or pressure are not feasible in bonding operation.
SPECS/FEATURES: all three adhesives are stated to maintain high strength properties over service temperature range of −67 to +160° F. Shear strengths of metal to metal assemblies bonded with these adhesives range from 2,300 to 3,200 psi at 75° F service temperature. They have high creep resistance under constant stress, exceptional adhesion to metals and plastics, and good resistance to water, hydraulic oil and aromatic fuels. Mfr stresses usefulness in honeycomb sandwich constructions because of excellent self filleting properties.
AIA FILE NO. 24-A
MFR: ADHESIVES, COATINGS AND SEALERS DIV, MINNESOTA MINING AND MANUFACTURING CO.
Circle 229 for further information

"Sedgwick concentrates responsibility by installing Sedgwick Dumb Waiters equipped with Sedgwick Dumb Waiter Doors."
"An investment in Sedgwick Dumb Waiters minimizes yearly costs of repair and replacement."
"Specifying Sedgwick assures maximum safety and performance."
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for quality buildings of every class
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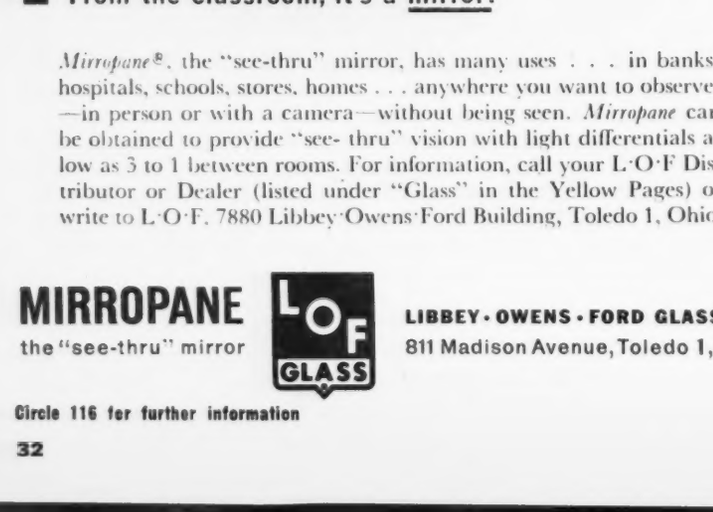
Circle 115 for further information

HOW TO WATCH WITHOUT BEING SEEN

From the darkened observation room, it's a window...



From the classroom, it's a mirror!

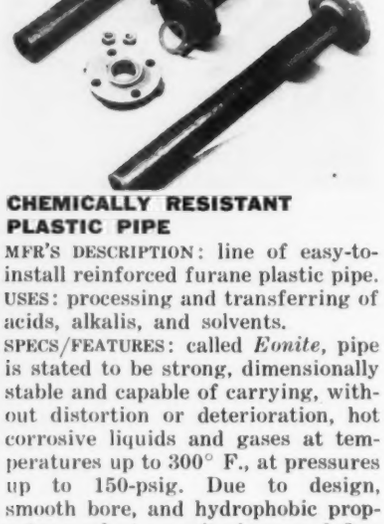
Mirropane®, the "see-thru" mirror, has many uses . . . in banks, hospitals, schools, stores, homes . . . anywhere you want to observe —in person or with a camera—without being seen. *Mirropane* can be obtained to provide "see- thru" vision with light differentials as low as 3 to 1 between rooms. For information, call your L·O·F Distributor or Dealer (listed under "Glass" in the Yellow Pages) or write to L·O·F, 7880 Libbey·Owens·Ford Building, Toledo 1, Ohio.

MIRROPANE
the "see-thru" mirror

L O F GLASS

LIBBEY · OWENS · FORD GLASS CO.
811 Madison Avenue, Toledo 1, Ohio

Circle 116 for further information



CHEMICALLY RESISTANT PLASTIC PIPE

MFR'S DESCRIPTION: line of easy-to-install reinforced furane plastic pipe.
USES: processing and transferring of acids, alkalis, and solvents.
SPECS/FEATURES: called *Eonite*, pipe is stated to be strong, dimensionally stable and capable of carrying, without distortion or deterioration, hot corrosive liquids and gases at temperatures up to 300° F., at pressures up to 150-psig. Due to design, smooth bore, and hydrophobic property, product permits increased flow rates up to 20 per cent greater than steel pipe of same size. Pipe may be sanitized by either steam or chemical sterilization, and is immune to fungus or bacterial attack. Physical and chemical properties are unimpaired by sunlight, moisture and outdoor atmospheric conditions. Mfr stresses ease of installation of *Eonite* plastic pipe.
AIA FILE NO. 29-B-81
MFR: HOOKER CHEMICAL CORP.
Circle 230 for further information

FIBERGLASS FLAKE PROTECTIVE COATING

MFR'S DESCRIPTION: *Fiberglas Flake Protective Coating* is stated to be a spray coating providing a corrosion-resistant surface to metals, wood and concrete.
USES: coating can be utilized in many fields where corrosion is a major problem.
SPECS/FEATURES: vapor transmission: less than .01 perms; shear strength: 800 psi, dielectric strength: 500 volts per mil. Coating, a homogenous mixture of *Fiberglas Flake*, resin, fillers, accelerator and pigment (if desired) can be utilized on chemical and oil storage tanks. stack jacket insulation, industrial ducting of chemical materials and concrete sewer lines. Other applications are suggested; as a liner for concrete industrial flooring, as a water sealant for concrete block and slab walls, etc. It also has decorative properties.
AIA FILE NO. 26-A-9
MFR: OWENS-CORNING FIBERGLAS CORP.
Circle 231 for further information

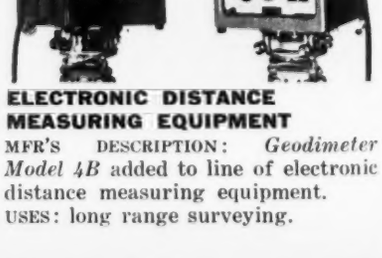
NEW LAMINATED PLASTIC SIZES

MFR'S DESCRIPTION: large-sheet sizes of laminated plastic line, announced.
USES: residential, commercial, and industrial applications.
SPECS/FEATURES: three sizes—30″ x 144″, 48″ x 144″, and 60″ x 144″, now in production. Immediately scheduled are three additional sizes —36″ x 144″, 60″ x 96″, and 60″ x 120″. Mfr states that 12′ lengths allow fabrication of seamless tops for most horizontal applications in kitchens and bathrooms. Seams are reduced in wall paneling and wainscotting applications in large commercial and residential areas. Smaller sheet sizes can be cut from large sheets with minimum of waste.
AIA FILE NO. 24
MFR: FORMICA CORP.
Circle 232 for further information

EPOXY TEST KIT OFFERED

MFR'S DESCRIPTION: test sampling kit containing equal 50/50 quantities of epoxy resin and hardener.
USES: "at the desk" test.
SPECS/FEATURES: mfr states *Twin-Weld* is permanent adhesive for use with metal, glass, ceramic, concrete, hard rubber, wood, fiberglass, and other materials in the aircraft, electronics, tooling, sheet metal, and other industries. Mfr claims no expansion or contraction. Resistance to acids, alkalies, grease, and solvents.
AIA FILE NO. 24-A
MFR: FYBRGLAS INDUSTRIES, DIV. SCHRAMM FIBERGLASS PRODUCTS, INC.
Circle 233 for further information

OFFICE AIDS



ELECTRONIC DISTANCE MEASURING EQUIPMENT

MFR'S DESCRIPTION: *Geodimeter Model 4B* added to line of electronic distance measuring equipment.
USES: long range surveying.

SPECS/FEATURES: new device offers following features; reading dial numbered to every ten divisions, course site included within instrument, Kerr cell heater permitting operation in temperatures from 40°F to 120°F, weight reduction of 20 lbs. (instrument weighs less than 30 lbs.), rubber holder for spare projection lamps enclosed within instrument, phase selector switch which permits faster, more accurate reading, speeded up internal measuring procedure, longer operating range in bright sunlight; up to 5,000′.
AIA FILE NO. 35-N-8
MFR: GEODIMETER CO., AGA CORP. OF AMERICA
Circle 234 for further information

HARDWOOD DRAFTING AND DRAWING TABLES

MFR'S DESCRIPTION: line of four-post hardwood drafting tables with steel drawers that never stick, warp, or swell, and hardwood pedestal drawing tables with positive lock tilt to prevent board slippage.
USES: architectural, engineering, and design offices.
SPECS/FEATURES: finished in dark oak, bases are reinforced with steel. Solid Basswood drawing board tops are kiln-dried, smoothly finished, sealed and lacquered. Zinc plated steel and cleats protect board ends and allow for expansion and contraction. Other features include: nylon glides, three-receptacle electrical outlet with cord mounted in frame, interlocking steel hinge for easy removal of table top, lock and two keys for drawers, and optional auxiliary cabinet with supply and file drawers. Board sizes range from 37½″ x 48″ to 43½″ x 84″.
AIA FILE NO. 35-H-3
MFR: STACOR EQUIPMENT CO.
Circle 235 for further information

ARCHITECT & ENGINEER BEVEL SCALES

MFR'S DESCRIPTION: two plastic four bevel scales for the architect and engineer have been introduced.
USES: scale measurement.
SPECS/FEATURES: lightweight, handy for desk or pocket use, scales have four beveled white edges. Packed in vinyl cases. Typical scale graduates for either architect's or engineer's scales.
AIA FILE NO. 35-H-3
MFR: C-THRU RULER CO.
Circle 236 for further information

FLOOR COATINGS/TILES

DECORATIVE AND PROTECTIVE FLOOR COATING

MFR'S DESCRIPTION: *Colorflex Plus AWA* is stated to have been developed with definite objective of creating a decorative and protective coating for floor surfaces.
USES: institutional and industrial projects.
SPECS/FEATURES: stated to resist the alkali content of cement; not affected by storage battery acid, lactic acid, fruit or vegetable acid, and cannot be softened by water, mineral oils, grease or gasoline. Other advantage claimed: penetrating synthetic resin base makes it perfect solution to difficult problem of painting concrete. Seals and colors other surfaces: wood, brick, composition available in red, gray, brown, green and clear.
AIA FILE NO. 24-B
MFR: FLEXROCK CO.
Circle 237 for further information

HEAVY TRAFFIC FLOOR TILE

MFR'S DESCRIPTION: a floor tile said to afford unequaled resistance to wear, scoring, denting and puncturing, has been announced.
USES: commercial and institutional installations.
SPECS/FEATURES: made of recently developed compound, *Nyracord*, tile is stated to not only withstand heaviest foot traffic, but is claimed to defy destruction by spikes, cleats and skates. Resiliency, slip resistance, wet or dry, and ease of maintenance are stressed. Product is known as *Mardi Gras* tile, is produced in five colors with either "confetti" or stippled design. Available in variety of thicknesses and size. Brochure and price list available.
AIA FILE NO. 23-D
MFR: AMERICAN MAT CORP.
Circle 238 for further information

SEALANTS/COMPOUNDS

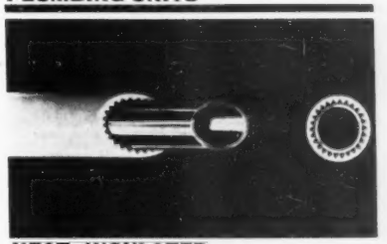
JOINT SEAL FOR MASONRY AND CONCRETE

MFR'S DESCRIPTION: the availability of the *Sealtight CM-60 Polysulfide Base Joint Sealing Compound* is announced as providing an all-purpose joint sealer.
USES: as a positive seal for both horizontal and vertical joints in masonry and concrete construction.
SPECS/FEATURES: self-curing seal that is weather and time-proof according to mfr. Highly resilient, and will not harden during application or cold flow after cure. Maintains positive bond from 0°F to 150°F. Available in two grades and furnished in three colors black, gray and tan to blend with adjacent construction.
AIA FILE NO. 17-J
MFR: W. R. MEADOWS, INC.
Circle 239 for further information

CAULKING COMPOUND IN CURTAIN WALLS

MFR'S DESCRIPTION: one-part sealant with butyl rubber base.
USES: caulking compound for permanently flexible joints in curtain wall products.
SPECS/FEATURES: *Butyl-flex* is formulated of non-oxidizing, non-migrating ingredients. Product stated to offer high resistance to water and weather as seal between glass, aluminum, steel, marble, plastic and most other construction materials. It will adhere without sag or slump over a wide temperature range from −20° to +180°F. Material is permanently flexible, non-corrosive to metal, non-toxic, non-staining, without objectionable odor or ozone deterioration.
AIA FILE NO. 7-D
MFR: DAP, INC.
Circle 240 for further information

PLUMBING UNITS



HEAT INSULATED COPPER TUBING

MFR'S DESCRIPTION: a heat insulated copper tubing, named *Thermotube* is designed on a unique principle of heat insulation.
USES: plumbing system tubing.
SPECS/FEATURES: a polyvinylchloride jacket is factory-extruded over copper tubing with an inner profile of star-shaped serrations. Tips of these serrations rest on copper tubing leaving longitudinal air-channels which act as insulation. Stated to be suitable for continuous use in temperature ranges up to 212° F. Provides unlimited resistance to cold and will not support combustion.

Halsey® Taylor ..the most modern line of drinking-water equipment you can buy

No. 5651—Ultra-modern recessed type; Vitreous China; self-closing stop, push-button glass filler. Two-stream projector, automatic stream control.

No. 5623—Streamlined face-mounted drinking fountain, heavy vitreous china, integral trap housing, concealed wall hanger. Two-stream mound-building projector and Halsey Taylor automatic stream control.

No. 5616—Face-mounted, vitreous china. Same specifications as No. 5623, except has 16" back wall face height.

No. 5601—Face-mounted, vitreous china. Same specifications as No. 5623, except has 12" back wall face height.

Modern in Design... TAYLORed for you!

You'll find Halsey Taylor Drinking Fountains modernly designed to blend harmoniously with individual interior decor! And, even more important, they are the products of a house devoted exclusively to the manufacture of quality drinking-water equipment.

The Halsey W. Taylor Co., Warren, O.

No. 5702—Battery Type. Concealed hangers. Two separate union supply connectors with positive shut-off valves. Two two-stream projectors, automatic stream control.

Halsey Taylor coolers, too, are available in wide variety—see latest catalog, or Sweets

90

Circle 117 for further information

PRODUCTS, EQUIPMENT, MATERIALS

Available in different colors for color-coding of installation.
AIA FILE NO. 29-B-41
MFR: COLUMBIA TECHNICAL CORP.
Circle 241 for further information

LABORATORY PUMP FAUCET

MFR'S DESCRIPTION: *Lab-Flo* is self-priming gooseneck type pump faucet for portable water supply.
USES: portable science tables for elementary schools, mobile demonstrations, and training programs.
SPECS/FEATURES: all brass and bronze construction and fitted with black bakelite wheel handle. A ¼" IPS union type tailpiece can be used either for rigid pipe connection or for slip-on connections with rubber or plastic tubing. Plunger assembly impels water instantly.
AIA FILE NO. 29-D-5
MFR: T & S BRASS AND BRONZE WORKS, INC.
Circle 242 for further information

MISCELLANY

ALUMINUM SAFETY TREADS FOR HEAVY TRAFFIC STAIRS

MFR'S DESCRIPTION: Aluminum *Super-Grit* stated to provide lifetime safety feature in the construction of new stairs.
USES: heavy traffic stairs in commercial, industrial and institutional buildings.
SPECS/FEATURES: 8" or 6" heavy duty aluminum safety tread units which

One slight push and big doors open surely and easily . . . when guarded with CORBIN Automatic Exit Fixtures.

Structurally dependable, they give *instant*, unfailing performance . . . meet safety standards everywhere—in schools—hospitals—churches—theaters—all public buildings.

Functionally styled, with choice of trim to suit all requirements . . . masterkeyed with other CORBIN Locks, if desired.

Available in cast brass, bronze or aluminum . . . in all standard finishes . . . for single doors, for double doors . . . for entrance and exit, for exit only. *Exclusive feature: all lever arms are drop forged, and equipped with oilite bearings.*

Here is CORBIN craftsmanship at its best!

Circle 118 for further information

FINISHING TOUCH FOR
PERFECT DOOR PERFORMANCE

CORBIN "880" HEAVY DUTY OVERHEAD DOOR HOLDER

Top performance for either exterior or interior doors. Dependable CORBIN quality evidenced by the following features: Inconspicuous . . . rugged . . . greater holding area . . . front mounted "off-and-on" lever . . . tension control screw easily accessible . . . 110 degree opening . . . heavy extruded brass track . . . extruded brass slide . . . deeply case-hardened dog and latch . . . concealed buffer spring . . . forged brass end brackets.

CORBIN BALL BEARING PIVOT HINGES

Top, Intermediate and Bottom Pivot Hinges to meet any load requirement. Completely sealed and lubricated for a lifetime of smooth, trouble-free, truly anti-friction performance. Outstanding feature: *adjustable* to permit raising and lowering of door to equalize the load on load-carrying pivots. Radial roller bearings and ball thrust bearings.

Ask your CORBIN Distributor for complete details.

IT PAYS TO MAKE IT CORBIN—THROUGHOUT!

CORBIN

P. & F. CORBIN DIVISION
THE AMERICAN HARDWARE CORPORATION
NEW BRITAIN CONNECTICUT

Circle 118 for further information

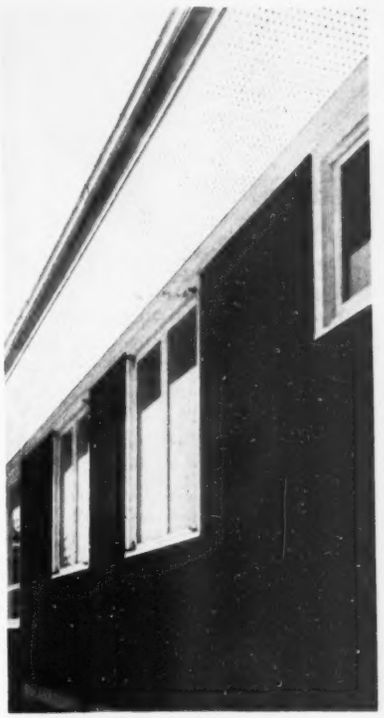
PRODUCTS, EQUIPMENT, MATERIALS

are built into steps during construction with anchors or other type of specified fastener depending upon stair material. For stairs subject to lighter traffic, narrower widths—1⅞", 3", 4", etc., are available which are also set into steps on a flush level or are superimposed and backed up with tile or other floor covering material. Treads are fabricated to order in exact lengths required up to 12' long. Constructed of non-corrosive architectural aluminum with 3/16" deep penetration of locked-in diamond-hard abrasive minerals. Literature available.

AIA FILE NO. 14-D-1

MFR: WOOSTER PRODUCTS INC.

Circle 243 for further information

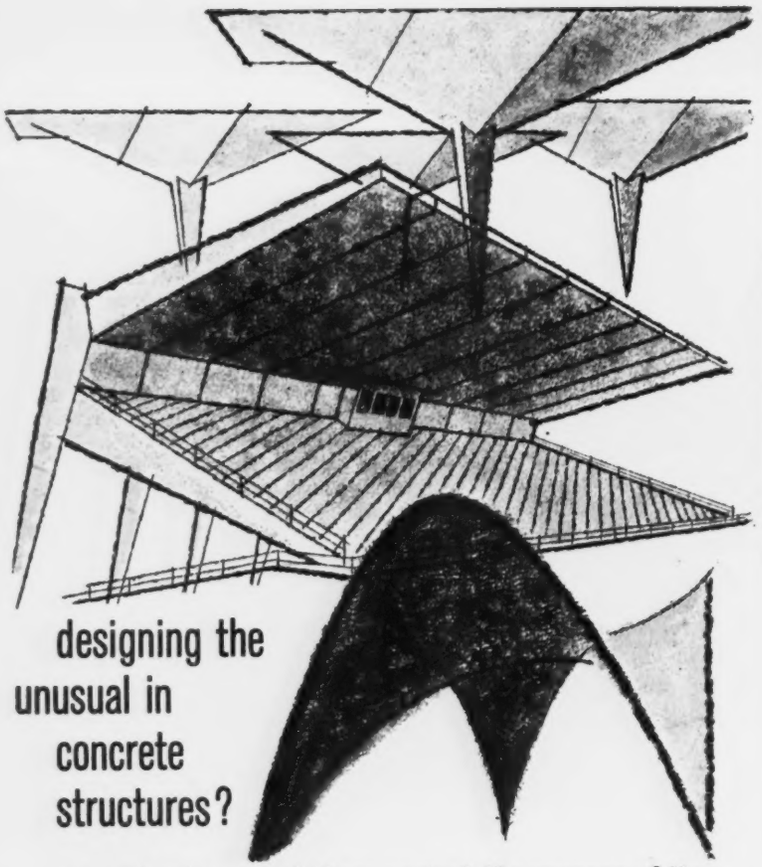


ASBESTOS-CEMENT SOFFIT PANEL

MFR'S DESCRIPTION: perforated asbestos-cement soffit panel which provides built-in ventilation, but does not require insect screening.

USES: eave overhangs.

SPECS/FEATURES: thousands of tiny insect-proof holes make panel self-ventilating without screening, louvres, or vents. Material will not sag, rot, or burn. Holes are small enough to meet FHA screening requirements. Uniform white finish is integral part of material. Autoclaving



designing the unusual in concrete structures?

remember to protect them against the ravages of time

Even the most delightful flight of fancy in prestressed concrete can eventually become unsightly through erosion and corrosion. Sometimes sooner than we like to think. One simple, low-cost assurance of long life is to specify vulnerable surfaces be coated with Thoroseal. This fine cementitious material will protect against moisture penetration and usual corrosion and it becomes a decorative surface in any of several colors, gray or white. Add to your files our specification guide describing Thoroseal and all other Thoro System products for masonry protection. Use the coupon below.

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Company_____

Address_____

Standard Dry Wall Products, Inc.

Box X-15 New Eagle, Pa.

Plants at New Eagle, Pennsylvania and Centerville, Indiana

Circle 119 for further information

process lends stability which mfr claims prevents soffits from buckling, warping, shrinking, or expanding. Available in 2′ x 4′ panels.
AIA FILE NO. 12-B
MFR: NATIONAL GYPSUM CO.
Circle 244 for further information

CUSTOM DESIGN IN VITREOUS ENAMEL

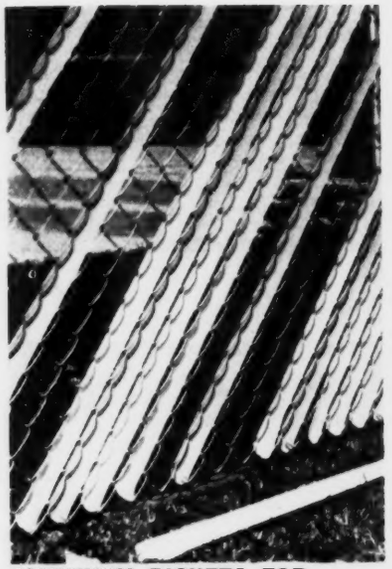
MFR'S DESCRIPTION: vitreous enamel is glass fused to metal at 1,500"F. Artist announces availability of custom designed pieces.
USES: interior and exterior design.
SPECS/FEATURES: enameling iron is generally used, but copper and precious metals may be used for smaller pieces. Different colored frits (glass) and oxides provide endless variety of colors and textures. Flat metal can be cut into irregular shapes or formed with hammers and sand bags into low relief. It can be pierced, punched, beat, spun, and welded. Standard architectural curtain wall panels can be decorated in variety of techniques. Wide range of commission prices and custom services.
AIA FILE NO. 15-M-1
MFR: DORIS HALL ENAMELS
Circle 245 for further information

IMPROVED ANCHOR BOLT CEMENT POURABLE

MFR'S DESCRIPTION: an improved pourable cement, reputed to greatly reduce time required for securely setting anchor bolts is offered under tradename *"Nacor Anchor Bolt Cement."*
USES: fastening of partitions, pipe flanges, hand rails, seats, toilets, parking stanchions, guide posts, fences, etc.
SPECS/FEATURES: furnished in powder form. Mixed with water, becomes semi-fluid, easy to trowel or pour. It is claimed to set in 10 minutes with virtually no shrinkage. Mfr states that anchor bolts can be drawn tight and ordinary stationary equipment put in operation within 30 minutes. A 60 minute waiting period is recommended for extra heavy vibrating machinery. Material is oil resistant.
AIA FILE NO. 3-A-9
MFR: NATIONAL ASPHALT CORP.
Circle 246 for further information

RE-DESIGNED NON-ELECTRIC DOOR CHIMES

MFR'S DESCRIPTION: the *Authotone* line of non-electric door chimes has been restyled by its mfr.
USES: in apartment houses and private homes.
SPECS/FEATURES: new aluminum outside plate has been designed for the *Universal Model* with anodized dull silver or gold finish. The chime enclosure (two notes) has light ivory finish. Model prices range from $4.95 to $8.25. Mechanism is entirely mechanical and contains no wires or batteries.
AIA FILE NO. 31-i-13
MFR: AUTH ELECTRIC CO.
Circle 247 for further information



ALUMINUM PICKETS FOR CHAIN LINK FENCE

MFR'S DESCRIPTION: architects seeking permanence, protection and low maintenance of chain link fencing, but needing color and privacy of private fencing, can achieve this effect at a reasonable cost, according to mfr.
USES: material can be utilized where only small areas need screening or where large expanses need solid, durable fencing.
SPECS/FEATURES: shaped aluminum strip is easily attached to either post or wire side of chain link fences. Locks securely in valley of fencing. Pre-cut for all heights of fences. Eight patterns have been developed. *Panelweve* snaps firmly into valley of chain link fences of standard 2" mesh or newer 2¼" mesh.
AIA FILE NO. 14-K
MFR: ALL PRODUCTS CO.
Circle 248 for further information

Circle 120 for further information about TUTTLE & BAILEY→

Imperialine
EXTRUDED ALUMINUM GRILLES
T&B
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Imperialine

EXTRUDED ALUMINUM GRILLES

Featuring trim, attractive, straight-line styling, Tuttle & Bailey Imperialine EXTRUDED ALUMINUM GRILLES are the answer to architectural demands for air distribution equipment that will harmonize with, or accent, linear design concepts. Universal in application, Imperialine Grilles may be used on the supply or return portions of heating, cooling, or ventilating systems and are ideal for ceiling, sidewall, floor, or sill installation. A Tuttle & Bailey exclusive, the grilles are standard with satin anodized finish. Special finishes and colors are also available.

For complete catalog data on Imperialine Extruded Aluminum Grilles, ask your nearest T&B Representative or write direct.

TUTTLE & BAILEY
division of Allied Thermal Corp.
New Britain, Connecticut

TUTTLE & BAILEY PACIFIC, INC. City of Industry, California

ADDITION TO ELECTRIC WATER COOLER LINE

MFR'S DESCRIPTION: lower-priced version of standard wall-mounted electric water cooler.
USES: installations where drinking water requirements are not heavy.
SPECS/FEATURES: *Cordwall WH6* has six gallon capacity and all design and operational features of 13 gallon *WH13*. It can be installed at any height and can be mounted flush with the wall, or in semi or full recess; 24" high and 15-¾" wide, cooler tapers in depth from 13" at top to 9" at bottom. Mfr cites two-thirds savings in space over ordinary floor cooler.
AIA FILE NO. 29-D-42
MFR: CORDLEY & HAYES
Circle 249 for further information

GAS-FIRED INTAKE AIR UNITS

MFR'S DESCRIPTION: a redesigned line of gas-fired air intake units for supplying make-up air to replace that removed by exhaust systems is now available.
USES: mechanical equipment for make-up air.
SPECS/FEATURES: four basic units available giving range of 15,000 to 90,000 cfm (1 million to 7 million BTU/hr). Basic units include burner, controls and belt or direct driven fan in a single housing . . . and assembled to meet job requirements with optional accessories including turning elbow, shutters, filter house, and outlet diffusers. Controls systems can be supplied to meet all operational, local code and insurance agency approval requirements.
AIA FILE NO. 30-G
MFR: HARTZELL PROPELLER FAN CO.
Circle 250 for further information

NEW APPLICATION FOR RETRACTABLE WALLS

MFR'S DESCRIPTION: full perimeter seal, folding partition walls.
USES: contracting and expanding hotel-motel dining, lounge, conference, and ballroom areas for parties, banquets etc.
SPECS/FEATURES: when extended, electric-hydraulic unit is solid, sound retarding wall. To open up area, it retracts flush with wall into a recess or folds compactly against wall. Panels are joined together with Soss concealed hinges, creating smooth, continuous wall free of butt hinge projections. Variety of surfaces are offered: embossed vinyl plastic with three dimensional effect, plywoods in natural grains, embossed aluminum, and hardboard with lithographed wood grain, or plain. No floor tracks or keepers required. Operates on regular 110 v. current with emergency provisions for manual folding.
AIA FILE NO. 16-D
MFR: ROBERT HAWS CO.
Circle 251 for further information

ADDITION TO PLYWOOD VENEER PANEL SERIES

MFR'S DESCRIPTION: *Palomino Samara* latest addition to U. S. Plywood's series of color-styled wall paneling.
USES: interior wall finishes.
SPECS/FEATURES: wall panel designed to blend with variations of same color with contemporary fabrics and floor coverings. Hardwood panel has light-blonde, chestnut tone color according to mfr's description. The *Samara* line features variety of natural wood colors and finishes.
AIA FILE NO. 19-E-6
MFR: UNITED STATES PLYWOOD CORP.
Circle 252 for further information

ALUMINUM & RUBBER IN ELECTRIC CABLES

MFR'S DESCRIPTION: type of electric cable with synthetic rubber insulation.
USES: homes and small industrial plants.
SPECS/FEATURES: insulation that can be produced in weather resistant colors was developed for cable to meet problem of providing permanent means of identifying various voltage phase wires that make up outdoor distribution cable. Cable itself is designed by process which reduces finished cable's diameter by compacting aluminum strands to eliminates interstices.
AIA FILE NO. 31-C
MFR: OLIN MATHIESON CHEMICAL CORP.
Circle 253 for further information

←Circle 120 for further information about TUTTLE & BAILEY

DRAFTING TRENDS

Helpful new booklet suggests drafting, engineering shortcuts

Just published—"DRAFTING SHORTCUTS" is a completely new booklet of helpful ideas and aids for engineers, draftsmen and students. It is well illustrated, clearly and logically written. It contains a wealth of time-saving tips to speed both routine and specialized tasks.

The ideas selected were submitted by professionals and judged by an impartial panel of widely recognized authorities on the various topics covered.

As an example, the section covering *Calculating Ideas* includes a simple means of locating stress points on cantilevered beams, also a simple method for retaining fundamental trigonometric relations.

In the section on *Drafting Shortcuts*, our editors have come up with topics like a simplified, fast and easy method for drawing gear teeth profiles and a rapid means of showing twisted wire elements.

The *Engineering Data* section covers new, easy-to-use shortcuts to formulas and engineering data.

There's a special section devoted to time-saving techniques on the drawing board, too. One of the suggestions on how to make life easier for the draftsman tells how to use a bent paper clip as a variable guide for making section lines.

For your free copy of "Drafting Shortcuts" contact your POST dealer or write today to the Frederick Post Company, 3654 Avondale Avenue, Chicago 18, Illinois.

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ENGINEERING EQUIPMENT & DRAFTING SUPPLIES • FIELD EQUIPMENT & DRAFTING FURNITURE

Circle 121 for further information

ABSTRACTS

TRANSPORTATION PLANNING

From a talk by Boyd T. Barnard, President of the Urban Land Institute, at the General Electric Metropolitan Transit Conference, June 1, 1960, New York City.

"The frontiers of any country usually present the greatest problems as well as the greatest opportunities. The frontiers of America are unquestionably our metropolitan communities.

"Attention to metropolitan problems and metropolitan planning is of the greatest significance today because all of our growth within the next two decades will take place there. That growth means 90 million more people by 1980.

"Consider that during the next ten years, our cities must expand as much as they did from 1630 to 1900, a span of almost 300 years.

"The growth in the use of the automobile has created problems which appear to be almost insoluble. The expected increase of automobiles in the next decade will mean bumper-to-bumper traffic not only on all our present roads, turnpikes and expressways, but all those that are in the planning stage. Transportation within our metropolitan communities is one of our greatest problems. . . .

"Suburban commuter railroads and transit companies will continue to get a smaller percentage of the total metropolitan transportation, but the number of riders will no doubt increase. More highways, of course, are required—more space for parking for more and more cars. The rails and buses, however, must continue to run, service must be increased, otherwise the function of the community will virtually collapse.

"Our sprawling suburbs will need more expressways to connect them with each other, and to connect to downtown, the city's heart. Expressways, with the required parking garages mean more and more land out of productive use and reduction of the tax base. One-third of all the land in the metropolitan area of Los Angeles is devoted to vehicular transportation facilities. Two-thirds of the area of downtown Los Angeles is devoted to freeways and streets and off street parking.

"To get coordinated action by local governmental bodies is a serious part of our transportation difficulty. The countless scores of governmental units that are a part of a sizable metropolitan economic area are appalling—cities, counties, townships, towns, boroughs. Have you tried to count them? In the greater Philadelphia area, which includes portions of New Jersey and Delaware, with which I have some familiarity, there are 457 separate governmental bodies. This complexity tends to make it impossible to get concentrated action on metropolitan affairs so urgently needed.

"Are there solutions to these problems? The answer is definitely, decidedly and emphatically yes.

"Certainly, on the top list of solutions is the coordination of all types of transportation. Transportation means moving people, whether it be on rails, in buses, or private cars. Highways must therefore be located and geared to the over-all transportation system. We want and must have these facilities, although highways into a central area cost huge sums. Land acquisition costs alone become appalling. The same money spent on a coordinated transportation system designed to move the most people the fastest into town would give us a better total result. The motorist has been and is the favorite son. He costs the communities a great deal more than the communities get back from him, even though gasoline taxes appear high.

"Nothing to my mind is so serious in the affairs of the metropolitan area as public transportation. It must be improved, enlarged, made more significant. Without it, our cities will stagnate. This public transportation must be made really metropolitan. It must combine in planning and in operation all the facilities in the community under some kind of authority. I do not necessarily mean a political authority, but this is the right way out. In my own community, which is Philadelphia, we are successfully combining some lines of the transit company with the suburban railroads. The city is underwriting a part of the deficit. This is subsidy, yes, but we are already subsidizing the motorist and the total subsidy on a coordinated transportation system is likely to be no more than our present subsidy cost. There is no alternative. Private automobiles on public highways can never carry the people. Commuter trains, subways and elevated lines, bear in mind, run regardless of weather. These must always be available.

"While it is unpopular to mention anything about our cold war adversary, Soviet Russia, I am impressed with the Moscow subway system, which makes it possible for every citizen of that city to reach a subway station within 15 minutes walk from his living quarters.

"Toronto, a few years ago, built a subway system and is about to build another. I understand the property values within two blocks of the subway soared three to seven times those values before the subway was built. Within three years, the increase in realty values exceeded the fixed charges on the subway by one-third.

"A realization of the need for metropolitan government is becoming evident. Steps are being taken in many areas. Toronto has this in certain of the area's functions. Authorities are being created that overlap political boundaries. Let's face the fact that the Golden Age of the suburbs has probably passed. Taxes in the suburbs often surpass the taxes within the city with no likelihood of stabilization at present rates. Suburban problems are becoming the same as the city's problems of 25 years ago. The city has much to offer the suburbs. The suburban communities are beginning to realize that their problems as they grow create a mutuality of interests which will force a consideration of the ways in which the city and the suburb can help each other. To annex or consolidate is not likely nor desirable, but the seriousness of community problems, as contrasted with just city problems, will force working agreements which will involve planning, utilities, municipal service, and I hope, transportation.

"The history of cities seems to be a reflection of the history of their leadership. It is true that some communities have natural advantages over others, particularly in geography, but as each crisis in the life of any community develops, the wisdom shown by those making decisions has largely been responsible for the nature and extent of that community's growth. In other words, the problems are usually human problems. The problems we face now will be solved by our abilities to coordinate great human resources that all of our communities possess and to follow through in the execution of the comprehensive plans that are or will be prepared to give us better living in our rapidly developing suburban areas."

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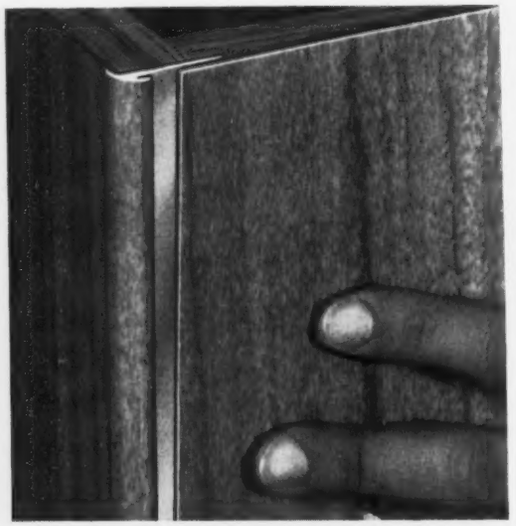
in colors and patterns of all plastic surfacing materials



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THE ANATOMY OF A NEW PROJECT

PREVIEW: 20

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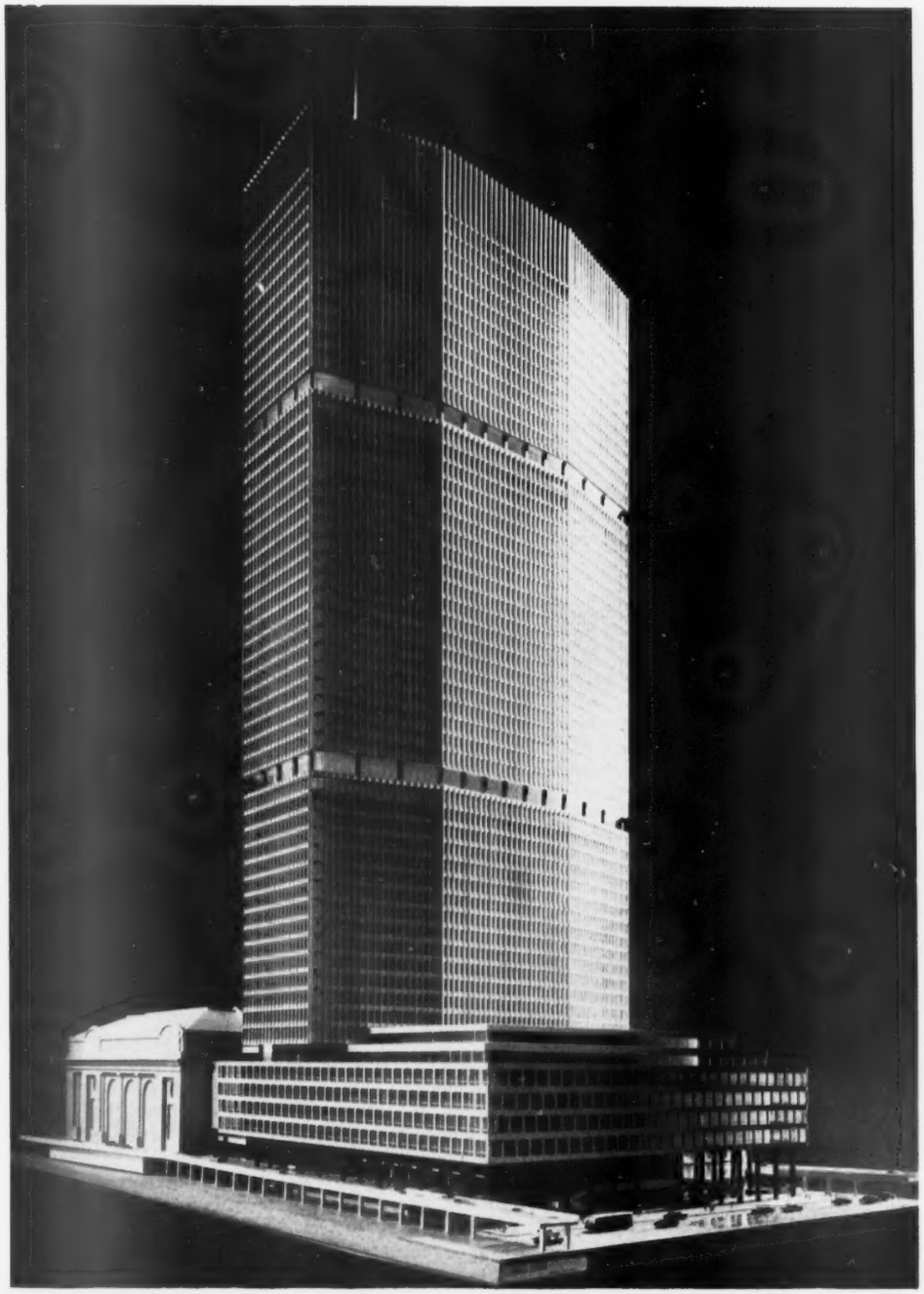

General program

Construction of the world's largest commercial building, Grand Central City, was started recently in mid-Manhattan. Scheduled for completion in 1962, the 58-story octagonal faceted structure, located on the 3½ acre site directly behind Grand Central Terminal, will occupy one of the city's costliest and most centrally located pieces of real estate. The $100 million structure will contain 2.4 million square feet of space, scheduled to house some 20,000 to 25,000 permanent occupants.

General features

Highlight of the Grand Central City building plan is a slender multi-faceted tower, set off by a transitional level from a broad eight-story base that ties into and continues the horizontal roof line of the terminal. The structure emphasizes eight separate surfaces of metal, masonry and glass.

The entire building, adjoining the north side of the Grand Central Terminal Concourse, will occupy the 151,000 square foot plot bounded by Vanderbilt Ave., East 45th St., and Depew Place. The structure, in addition to bearing the name Grand Central City, will also be known as 200 Park Ave.

The structure is oriented in an east-west direction with the axis of the tower centered on East 45th St., which permits sweeping views across the width of Manhattan from Hudson River to East River, and broad vistas up and down Park Ave. It will be set back on the 45th St. side and create, in effect, a 75-foot street, approximately the width of Madison Ave. A feature of this design treatment will be a broad, roofed-over landscaped plaza, 40 feet high, along the East 45th St. entrance to the structure.

Plan elements

The skyscraper, which will rise to a pinnacle of 775 feet, will provide a backdrop for the terminal. The eight-story base and transitional floor carrying the tower, will contain approximately 800,000 square feet. Individual tower floors, ranging in size from 31,000 to 35,000 square feet, will provide an additional area of nearly 1.6 million square feet.

Vehicular transfer drives, giving the building direct access to the uptown and downtown Park Ave. ramps are part of the building plan, which also includes interior pedestrian walks and escalator connections to and from the main terminal concourse. Within Grand Central City itself will be a 400-car garage reached from both the southbound and northbound elevated Park Ave. ramps. Special roadways will connect with the ramps enabling cars to stop and deposit people who can enter the building from a special entrance at ramp level. A total of 15 truck berths along the Depew Place frontage of the building is being provided for off-street loading and deliveries to the structure.

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A series of ingenious construction techniques have been worked out for Grand Central City which faces a dual problem in skyscraper building. The building will rise not only over the operating tracks of the New York Central and New Haven Railroads, but also over the station platforms of the terminal itself. Furthermore, the building is flanked at the second floor level by the north and southbound Park Ave. ramps. The con-

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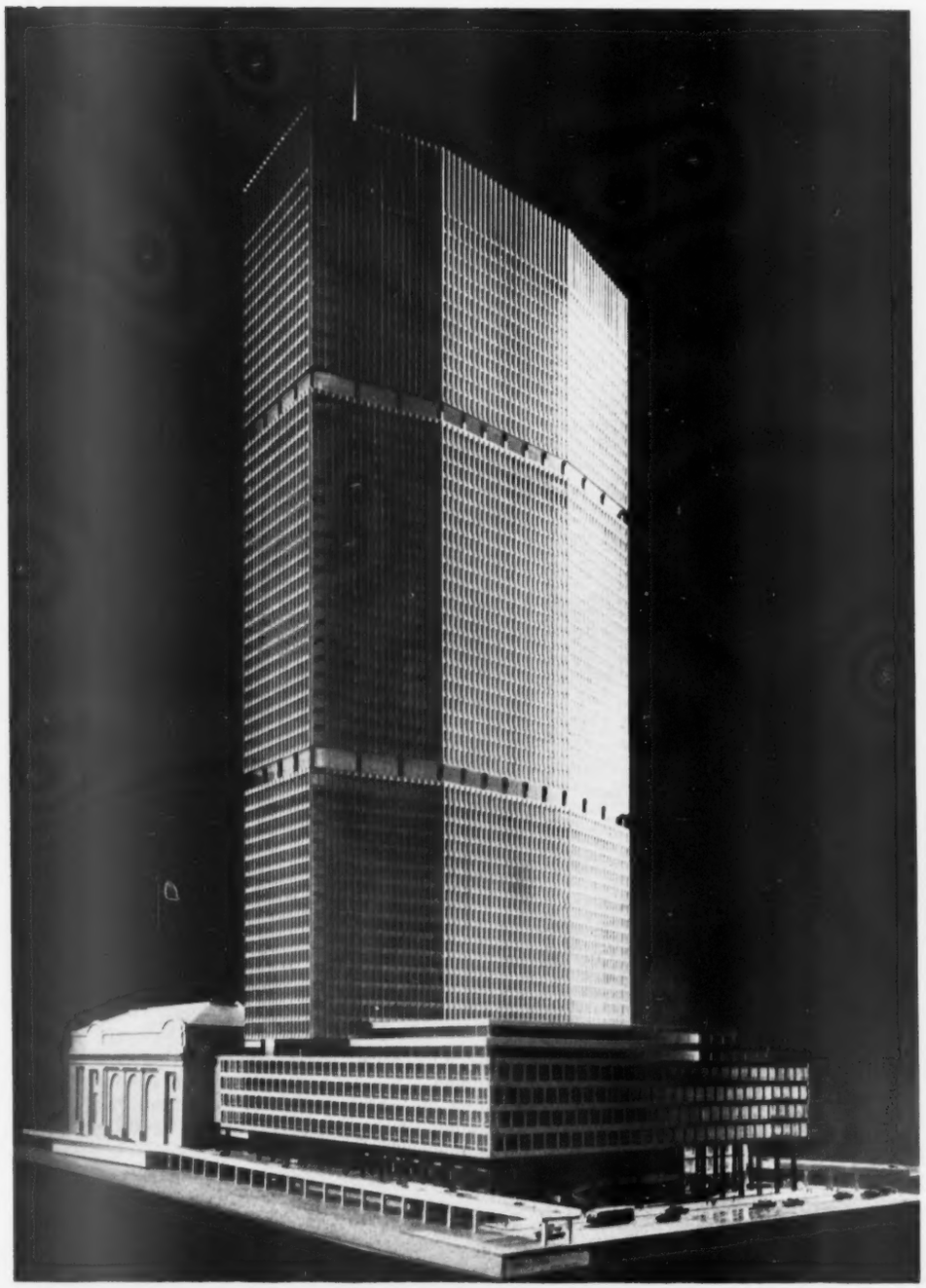

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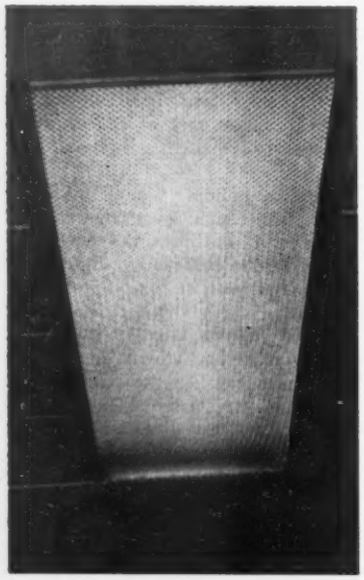
(Continued on page 42)

Here's an
IDEA
for architects
who want
brightness
without glare



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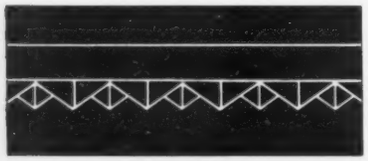

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struction plan thus calls for the huge structure to be built without disrupting either rail or vehicular traffic and for handling access and egress of equipment and materials despite the difficulties imposed by the site.

Because of the extraordinary conditions, construction work on the footings, foundations and structural steel work was actually scheduled to take place before the existing six-story building was completely demolished. The structural frame will go up in two stages. The base section of the skyscraper will be erected on the same supporting columns that have served the existing building. At the same time, a new series of intricate, specially designed footings and foundations, 55 feet below street level will anchor steel columns that will, in turn, pierce the two platform levels of the terminal to support the tower. The two structures will mesh as they emerge from the ground.

To isolate Grand Central City from the noise and vibrations of railroad rumble, a triple-decker sandwich of lead, asbestos, and sheet steel will be used as insulation. The insulation mats will be inserted under the new steel columns, between the existing and new columns and between the north wall of the terminal and the south wall of Grand Central City.

The entire sub-surface operation, confined to an island of tracks and platforms, will move forward without interfering with New Haven or New York Central traffic.

A number of devices have been developed to get materials to the site. Flat cars will haul equipment and supplies, concrete mixing plants will produce right on the site, materials will be lowered from street to sub-surface through holes punctured in the railroad structure, and special underground rigging will be installed to lift steel in the early construction stages.

The construction schedule calls for substantial night activity to take advantage of light commuter traffic. Operations by day will be timed to the split second to coincide with the arrival and departure of trains.

Vertical transportation

Traffic within the building will be handled by 65 elevators and 21 electric stairways. One bank of six elevator cars will be the fastest in the world, capable of traveling more than 1,600 feet a minute. The passenger-operated elevators will be electronically guided by automated controls. A control system enables a bank of elevators to work together as a team, giving equal service to all upper and lower floors. The control system has seven different patterns of operation, so it can handle all the varying traffic conditions occurring in the building throughout the day.

An automatic traffic pattern control computes the correct traffic pattern to meet actual conditions at any particular moment during the business day. Using a special type of electronic computer, it weighs the load of each car, counts the number of corridor calls, the number of floor by-passes and then measures these factors against time. After some split-second arithmetic, the control picks the most efficient traffic pattern for the elevator bank. All of this is achieved without human supervision.

The 21 electric stairs will incorporate a recently developed step which provides for additional passenger safety. Eight of the moving stairs will be 48 inches wide and 13 will be 32 inches. These will carry more than 250,000 persons daily from the main concourse of Grand Central Terminal and from street levels on Vanderbilt Ave. and East 45th St. to Grand Central City's main lobby.

Electrical notes

Grand Central City will be completely floored with over 56 acres of prefabricated steel panels electrified for carrying thousands of miles of wire and cable. Manufactured from light gauge steel, the floor panels were developed specifically to reduce dead load weight on footings, foundations and structural steel work of the building. At the same time, the floors will be so electrified as to provide versatility for electrical systems and easy, economical "tap-offs" to all electrical sources for maximum flexibility without obstructing placement of partition walls, furniture and office equipment.

Installation of the flooring will be facilitated by the large area per unit and the simple interlocking design molded into each panel. The steel floor units are placed and aligned on the structural steel and welded to provide proper anchorage. After the floor sections have been welded into place, and the electrical fittings secured to the panels, a concrete slab is poured to provide a wearing surface. The result is a floor system only 4" in depth but with heavy load capacity, containing built-in "raceways," immediately accessible, carrying the full electrical system to every part of the building. The steel deck panels are galvanized for protection.

HVAC

Grand Central City will contain the world's largest office building refrigeration plant with a cooling capacity equal to the melting of 20 million pounds of ice every 24 hours. Built-in flexibility, planned to meet requirements of individual tenants, will allow the tenant to enjoy air-conditioning after normal work hours; will cope with special business operations such as broadcast and television studio facilities; and will adjust to such other peculiar office needs as heavy business machines and electronic processing equipment rooms. The octagonal shape of the building with its eight separate exterior exposures has also prompted unusual treatment of periphery areas.

Dominant in the air-conditioning installation will be an air induction system zoned both vertically and horizontally for the periphery of the building. Supplying fresh air to the 5,000 high pressure induction units in the outside walls will be large central fan rooms, to be located on the roof, the 46th floor and on the 21st floor.

Complementing the system for "outside" offices is a distinctive method for handling interior areas. Two-zone treatment for the interiors of each tower floor is being provided to insure the high degree of flexibility in air-conditioning.

Grand Central City will feature two individual air supply systems on every tower floor. Each half of every floor will have a separate fan room to serve its interior space. This is a departure from the commonly used system in office buildings that recirculates air from central interior supply rooms located at various distribution points in the structure. Special air-conditioning techniques have also been developed to serve peculiar needs of service facilities in the building, particularly large restaurant operations planned.

To move the quantities of air necessary to keep the building at comfortable conditions of temperature and freshness, fans delivering approximately five million cubic feet of air per minute have been specified. One of the aspects of the installation will be rigging required to set up the machinery room. Because the building will rise directly over the tracks and station platforms of the New York Central and New Haven railroads, the structure will not have a basement—the conventional location for most of the heavy heating, ventilating and air-conditioning equipment. instead, the three refrigeration machines—each weighing 100 tons— will be raised aloft 775 feet to the roof of the structure where a machinery room will be set up in conjunction with the cooling tower.

Costs and area

Area	2,400,000 sq. ft.
Costs	$100,000,000

LITERATURE

Literature cited in this department is available from various manufacturers and associations free of charge, except where indicated. To obtain copies, circle the keyed numbers on the reader service cards facing pages 1 and 56.

TEXTILE FIBER MATERIALS

Fiberglas Textile Fiber Materials For Industry, stated to be most complete compilation of technical data on this subject, is now available. Booklet is designed to show wide range of industrial applications in which *Fiberglas* materials made from continuous filament and staple fiber processes can be effectively utilized. Booklet contains sections on continuous filament yarn, treated yarn, staple fiber textile materials, cordage and sewing thread, scrim, mat, roving, chopped strands, milled fibers, fabrics and tapes, and standard packages for *Fiberglas* textile fiber materials. Other features include an explanation of how *Fiberglas* is made, a textile fiber comparison chart, and a section describing fabrication of textile fiber materials. (52 pp.)

AIA FILE NO. 26-A-9

MFR: OWENS-CORNING FIBERGLAS CORP.

Circle 300

COLOR COORDINATOR

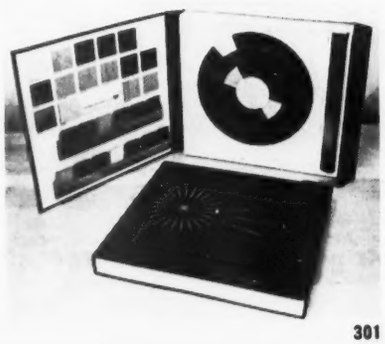
Presentation kit recently developed as means of visually presenting full spectrum of color available in company's line of office furniture. Incorporated in one package are 74 separate sample pieces of steel, *Naugahyde,* leather and *Gros Point* upholstery fabrics, plastic laminate top materials, and vinyl desk top edging. Three color wheels of different standard *Naugahyde* colors are topped successively by a smaller dial bearing swatches of 16 standard *Gros Point* fabric colors and by another on which samples of the eight leather colors are arranged. Top dials revolve independently of bottom *Naugahyde* circle. All together, 384 standard color-material choices are produced. Arranged opposite color dials, are squares of plastic laminate (16 standard selections) most widely used as desk top finish coverings. Price, $15.00. Write direct to Jenkintown, Pa., enclosing payment.

AIA FILE NO. 25-J

MFR: COLUMBIA-HALLOWELL DIV., STANDARD PRESSED STEEL CO.

Write manufacturer directly

300



301

CERAMIC VENEER

Each step in the preparation and application of ⅜ *VitriNeer* is described and illustrated in current booklet. Detailed specifications are given for pointing and setting mortar as well as application techniques for use over masonry, metal lath and stud backing or wood stud and metal lath backing. Booklet also contains specification chart and conversion chart showing square footages and weights for *VitriNeer* adhesion-type ceramic veneer units. (28 pp.)

AIA FILE NO. 23-A

MFR: THE ROBINSON BRICK AND TILE CO.

Circle 301

MASTER TV SYSTEMS

Designing and Installing Master TV Systems is current manual dealing with TV systems for motels, hotels, apartment houses, hospitals, institutions, office buildings, showrooms, schools, trailer parks, and communities. Included in the manual are sections on types of building construction, design of systems, and installation of cables and all components. Block diagrams illustrate typical combinations of antennas, amplifiers, cable and distribution components such as couplers, tapoffs, and transmission line splitters. Cross-section drawings provide guide for installing systems. Pictured are TV sets, necessary wall openings for tapoffs, transmission line installation, and specific components required. Also section on "unit substitution method." (24 pp.)

AIA FILE NO. 31-i-6

MFR: BLONDER-TONGUE LABORATORIES, INC.

Circle 302

POWDER-DRIVEN FASTENERS

A handbook for architects and engineers providing information on the various applications of powder-driven fasteners in the field of construction. Sections include: powder-driven fastening systems, specifications, applications to concrete and steel, bolting with internal threaded fasteners, substitutes, approvals and acceptances, field clearance requirements and limitations, design loads and fastener tests, and glossary of terms. Special price to ARCHITECTURAL & ENGINEERING NEWS readers $1.00. Write direct on letterhead to 289 Winchester Ave., New Haven 4, Conn. (50 pp.)

AIA FILE NO. 17-F

MFR: RAMSET FASTENING SYSTEM WINCHESTER-WESTERN DIV, OLIN MATHIESON CHEMICAL CORP.

Write manufacturer directly

EXCAVATION ESTIMATES

Current brochure describes estimating system for supporting excavations. Economies of system are indicated in savings of labor, time, money, material, and in added safety. System is applicable to foundations up to 50-feet in depth when soil can be drained. Chart is not applicable for highly plastic clay soil. Brochure tells how and where to use this sheeting method for savings stated to ex-

LITERATURE

ceed $1.00 per sq. ft. of sheeted area and cities advantages for use in problem foundation conditions. (4 pp.)
AIA FILE NOS. 2, 6
MFR: CONTACT SHEETING, INC.
Circle 303

SPRINKLER SYSTEMS

Revised edition of installation manual available, indicating how to plan, lay out and install underground sprinkler systems. Steps outlined to permit installation of system in as little as 3½ hours, mfr states. Scaled graph sheet is included together with templates showing coverage of sprinkler heads at various pressures. Information also presented on flexible pipe and fittings. (8 pp.)
AIA FILE NO. 38-K-3
MFR: RAIN JET CORP.
Circle 304

LIQUID GAS STORAGE

Liquid storage and conversion stations are subject of current brochure. Literature covers advantages and component units of stations which are used to supply oxygen, nitrogen and argon to volume users of these industrial gases. Types and sizes of stations available for both medium and low pressure operation are presented, together with typical installation and flow diagram of medium pressure unit. (6 pp.)
AIA FILE NO. 29-F
MFR: AIR REDUCTION SALES CO., DIV. AIR REDUCTION CO., INC.
Circle 305

SEATING CHART

Seating chart reference sheet offered, showing seating capacity of grandstands up to 20 rows high, 222' long. Separate figures given for stands which allow 18" per seat and stands allowing 16" per seat. Includes photographs of various grandstands and bleachers and listing of recent installations at schools and universities.
AIA FILE NO. 35-F-11
MFR: STANDARD STEEL BLEACHER DIV.
Circle 306

SIDING SYSTEM

Current brochure covers various types of installations labeled *Sturd-i-wall Construction*, a combined siding-sheathing in form of resin overlaid fir plywood panels. Brochure outlines advantages to builders and covers specifications for this method of building for *Texture One-Eleven*, board and batten style and wide-lapped siding. Also covers insulation factors for all areas of United States, details bracing strength factors and provides blank tables for computing comparative in-place costs. (12 pp.)
AIA FILE NO. 17-A
ASSN: DOUGLAS FIR PLYWOOD ASSN.
Circle 307

MIXING VALVES

Recent brochure describes and illustrates *Simix* installations for new construction and modernization of existing facilities. Operation and use of thermostatically controlled valves are presented. (8 pp.)
AIA FILE NO. 29-D
MFR: SIMIX CO., INC.
Circle 308

AGGREGATES

AGGREGATE TESTING

Current bulletin describes apparatus and procedures for determining surface capacities of aggregates used in bituminous mixtures by means of a centrifuge kerosene equivalent (CKE) test. Test determines absorbtion capacities of both coarse and fine aggregates by measuring amount of kerosene absorbed by samples of test materials in a centrifuge. Also provides measure of relative particle roughness or degree of porosity of test materials. Bulletin defines scope of test (originally developed by Materials and Research Department of California Division of Highways), describes equipment and materials used in it, and explains step-by-step procedures. (8 pp.)
AIA FILE NO. 3-D-2
MFR: SOILTEST, INC.
Circle 309

AGGREGATES/ABRASIVES

Catalog describing *Alundun* aggregates and non-slip abrasives, designed to provide safe, wear-resistant walking surfaces, currently available. Photographs show applications of material which is available in four types: terrazzo aggregate; non-slip abrasive; cement floor aggregate; and stair and floor tile. Catalog contains specifications, application methods and recommended installations, including such areas as stairways, entrances, aisles, corridors and ramps in schools, hospitals, churches, stores, hotels, office buildings and industrial plants. (8 pp.)
AIA FILE NO. 23-H
MFR: NORTON CO.
Circle 310

HVAC

CENTRIFUGAL FANS

Current bulletin (No. A-1103) describes *Series 116* centrifugal type airfoil bladed fans. Bulletin discusses features of fans and lists suggested applications. Construction for Class I, Class II, and Class III airfoil bladed fans is described and illustrated. Low velocity radial rim wheel design is discussed in detail. Modifications which adapt series to meet specifications for wide variety of application conditions is also included. Another section compares outlet dampers, variable inlet vanes, slip ring motor and Gyrol fluid drive in terms of effectiveness, power requirements, and cost. Thirty pages of capacity tables for standard air conditions are given with values for each size with static pressures from ¼" to 11½" water gauge. Problem solutions are provided for "cold static" and "constant pressure" methods. Outline type installation drawings are provided to convey basic dimensional data for all sizes and arrangements. (60 pp.)
AIA FILE NO. 30-D-1
MFR: AMERICAN-STANDARD INDUSTRIAL DIV., AMERICAN RADIATOR & SANITARY SUPPLY CORP.
Circle 311

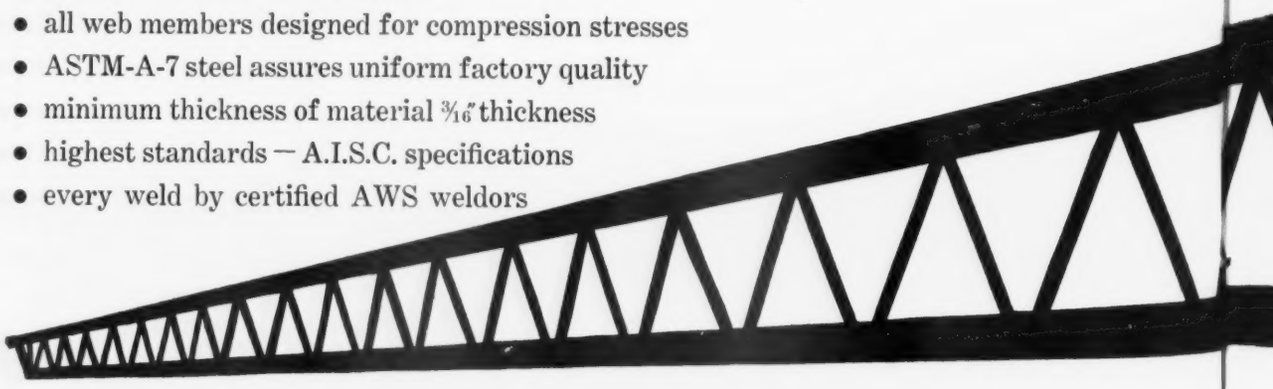
COOLING WATER SYSTEMS

Four reprints dealing with several aspects of cooling water systems are now available. Reprint No. 88, *Selection of Treatment for Cooling Waters*, outlines major factors that

1950: 65 feet long . . . 1955: 125 feet long . . .

NOW: HAVEN-BUSCH T-CHORD* LONGSPAN JOISTS

- the longest steel joist made
- one-piece fabrication with matched-fit splices
- modern T-Chord* construction
- all web members designed for compression stresses
- ASTM-A-7 steel assures uniform factory quality
- minimum thickness of material 3/16" thickness
- highest standards — A.I.S.C. specifications
- every weld by certified AWS weldors



Opens new horizons for you in planning larger clearspan, column-free interiors.

*T.M. Reg.

Circle 123 for further information

cause problems in industrial cooling systems. (6 pp.) Reprint No. 91, *Water Treatment for Poly-metallic Cooling Systems,* (10 pp.), points up problems associated with poly-metallic closed and open-recirculating cooling systems and recommends type of corrosion inhibitors designed to obtain optimum protection of all metals. The concept of high-level, start up dosages of corrosion inhibitors in open recirculating and once-through systems is covered in Reprint No. 92, Cooling Water Inhibitor Performance. (8 pp.) Process bulletin C-2 covers comprehensive method for treating and protecting recirculating water equipment and process water systems. (4 pp.)
AIA FILE NO. 29-D-42
MFR: NALCO CHEMICAL CO.
Circle 312

AIR-CONDITIONERS

Current manual describes *PAC,* packaged air-conditioner line including product details and technical data. Cutaway illustrations provide for visual analysis of fan section, panels, filters, cooling coils, drain pan, electrical controls, condensers, (water and air cooled), refrigerant drier/strainer, liquid sight glass, receivers, refrigerant charge, compressors and cabinet. Other sections include: accessories, capacity specifications, ratings, piping diagrams, wiring diagrams, and warranty statement. (12 pp.)
AIA FILE NO. 30-F-2
MFR: DUNHAM-BUSH, INC.
Circle 313

CONCRETE USES

PRECAST CONCRETE UNITS

Current folder describes how use of precast concrete cellular floor and roof decks provides network of raceways for electrical, televison and telephone wiring in University of Houston's new Heyne Building. Illustrated with photos and diagrams, folder explains how wiring was run from electrical panel box in the first floor hallway up through hollow cells of second floor for first floor lighting, and down into first-floor floor cells to electrical outlets. (6 pp.)
AIA FILE NO. 4-K
MFR: THE FLEXICORE CO., INC.
Circle 314

CONCRETE CURTAIN WALLS

Current edition of *Perlite Design News,* No. 5, Vol. 60, describes characteristics of perlite concrete backup walls. It differentiates between perlite sandwich panel type of curtain wall and skin/perlite backup type of curtain wall. Issue includes diagrams of typical spandrel sections incorporating use of perlite insulating concrete in curtain wall construction. (2 pp.)
AIA FILE NO. 4-E-13
ASSN: PERLITE INSTITUTE, INC.
Circle 315

METAL UNITS

DISPLAY CASE

Catalog covering *Viewmatic* stainless steel display case now available. Illustrated in color, it describes four available models and shows how case can be mounted on wall with mounting strips which come with it. Available in variety of colors, with mirror backing tilted for visibility from any height. Well illuminated, the case meets requirements of the National Sanitation Foundation. (4 pp.)
AIA FILE NO. 35-H-5
MFR: THE BASTIAN-BLESSING CO.
Circle 316

SHELVING CATALOG

Current catalog describes complete line of industrial and commercial steel shelving. Catalog *2400,* contains full information of boltless T-line shelving, angle shelving, tool storage inserts, drawer case units, bin units, custom shelving arrangements, and truck shelving. Also included is section on steel lockers, storage cabinets, and book case shelving. Typical applications are discussed to aid in selecting most suitable type of shelving for economical, efficient installation. Also described are pre-paint phosphatizing process and other quality control procedures. Specifications for each type of shelving are listed, as well as tables of dimensions and capacities.
AIA FILE NO. 35-i-15
MFR: PENCO DIV., ALAN WOOD STEEL CO.
Circle 317

SOLAR SHADING

Current pamphlet describes and illustrates *Brise Soleil,* modular system of aluminum components, for sun shading installations. Photographs of installations are provided, together with suggested specifications and detail drawings showing suspended, cantilevered and supported installations. Table is included to furnish dimensional data. (6 pp.)
AIA FILE NO. 19-E
MFR: ARCADIA METAL PRODUCTS
Circle 318

FLOORING MATERIALS

SLIDING GRILLES

Brochure on steel or aluminum sliding grilles consists of detailed drawings, specifications, suggested applications, and photographs of typical installations. *Bulletin S.G. 5* is directed at architects, engineers, plant managers, and others faced with problem of how to protect an opening or area with attractive, flexible barrier at reasonable cost. (4 pp.)
AIA FILE NOS. 14-B-6, 16-D
MFR: CORNELL IRON WORKS, INC.
Circle 319

CEMENT FLOORING

Current catalog describes *Marbleoid* oxychloride cement flooring materials. Included, along with a listing of typical installations and short form specifications, are descriptions of *Marbleoid* oxychloride terrazzo, plastic magnesia, underlayment and cupric oxychloride bacteria-destroying composition flooring. (4 pp.)
AIA FILE NO. 23-D
MFR: THE MARBLEOID CORP.
Circle 320

ASBESTOS/ASPHALT FLOORS

Revised set of installation specifications for vinyl asbestos tile and asphalt tile flooring for use by architects, builders, flooring contractors, etc., announced. Bulletin gives wide variety of information on proper use

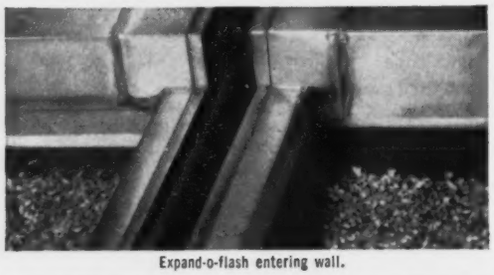
Better building begins with structural steel by **HAVEN-BUSCH** *Company*

Write for illustrated brochure with full technical data.

3455 Chicago Drive, S.W., Grandville, Mich.
CHICAGO OFFICE: 228 N. LaSalle
DESIGNERS • FABRICATORS • ERECTORS
SINCE 1888
T-Chord* Longspan Joists — Structural Steel — Miscellaneous Iron
Circle 123 for further information

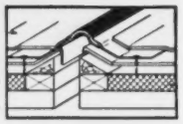
Expand-o-flash With the NEOPRENE BELLOWS

What happens when YOUR EXPANSION JOINT HITS THE WALL?



Expand-o-flash entering wall.

Curb roof expansion joint.



Low profile expansion joint.

Literature, engineering data and sample on request. See us in Sweet's. Some distributorships available.

L&R LAMONT & RILEY CO.
300 SOUTHWEST CUTOFF, WORCESTER 7, MASS.

Circle 124 for further information

Push-it
Rock-it
Roll-it
Press-it

THE ALL-NEW P&S® ROCKER-GLO SWITCH

... the switch that *looks* right, *feels* right and *is* right for every type of wiring job.

Here is the one switch with the most wanted features on the market today.

The merest touch causes instant, silent action ... and Rocker-Glo glows in the dark.

Available in Despard and narrow rocker types.

Write for brochure, Dept. AE-86

P&S® PASS & SEYMOUR, INC.
SYRACUSE 9, NEW YORK

50 E. 42nd St., New York 17, N.Y. 1440 N. Pulaski Rd., Chicago 51, Ill. In Canada: Renfrew Electric Co., Ltd., Toronto, Ontario

Circle 125 for further information

LITERATURE

of concrete and wood sub-floors, and where to use them. Special note of caution is inserted regarding use of concrete curing compounds. Plywood types and sizes for sub-floors are indicated. Various underlayments used to correct rough or uneven sub-floors are covered, as well as simple maintenance instructions for newly completed installations. (4 pp.)

AIA FILE NO. 23-G

ASSN: ASPHALT AND VINYL ASBESTOS TILE INSTITUTE

Circle 321

NOISE CONTROL

ACOUSTICAL TILE

Characteristics of *Styltone*, non-combustile, random-fissured acoustical tile, presented in current brochure. Tile's effect is illustrated through photographs of installations in offices, clubs, institutions and commercial buildings. Sound absorption coefficients, light reflectance values and unit weight of material given in tabular form. Also included are sizes, styles and installation facilities available. (4 pp.)

AIA FILE NO. 39-B

MFR: ACOUSTICAL PRODUCTS DIV., BALDWIN-EHRET-HILL, INC.

Circle 322

ACOUSTICAL PANELS

Specifications for use of *Masonite Peg-Board* panels, backed with sound absorbing material, as acoustical treatment of walls, partitions, baffles, ceilings and elsewhere have been issued in Technical Bulletin A-259. Detailed installation instructions include information on cutting and working, conditioning, finishing, and application. (2 pp.)

AIA FILE NO. 39-B

MFR: MASONITE CORP.

Circle 323

SOUND INSULATION

Technical Bulletin No. 11, *Sound Insulating Partitions and Floors* includes sound transmission loss information on a resilient clip system used in conjunction with prefabricated metal stud assembly. States degree of sound resistance desired is influenced by certain factors besides those involved in selection of construction assembly. Illustrated tables give figures on sound transmission reduction for partitions, broken down into types of partitions, construction: plaster, lath; and average transmission loss in decibles. Types of partitions listed include solid studless, solid with channel studs, wood studs, prefabricated metal studs, double row channel studs, staggered wood studs, etc. (4 pp.)

AIA FILE NO. 20-B-1

ASSN: METAL LATH MANUFACTURERS ASSN.

Circle 324

SEALANTS

WEATHERSTRIPPING

Information about dust, noise, drafts, leaks, and light given in illustrated booklet. Emphasis is placed upon the weatherstripping of commercial and industrial buildings covering new techniques and materials. (14 pp.)

AIA FILE NO. 35-P-6

MFR: PEMKO MANUFACTURING CO.

Circle 325

VAPOR SEAL CATALOG

Catalog 1660, *Sealtight Premoulded Membrane Vapor Seal*, announced. Catalog discusses scientifically true vapor seals in modern construction and covers application information, specifications and installation data. Graphically illustrated.

AIA FILE NOS. 37-E-1, 7-A-1

MFR: W. R. MEADOWS, INC.

Circle 326

LIGHTING

LIGHTING GUIDE

Bulletin GEA-7100 provides layouts, specifications and application data for entire street-lighting systems. Includes footcandle guides for *Preferred Lighting* line of filament, mercury, and fluorescent units and product data on lighting units, controls, ballasts, poles and brackets. Illustrated with photos of typical street, highway, shopping center, and parking area lighting applications. Includes prices, discounts, terms, and conditions of sale. (28 pp.)

AIA FILE NO. 31-F-2

MFR: GENERAL ELECTRIC CO.

Circle 327

PLASTICS FOR LIGHTING

Current catalog designed to facilitate accurate integration of extruded plastics into modular lighting requirements announced. All photometric data is set up in indexing sequence; that is, each prismatic lens panel is fully covered for both polystyrene and acrylic on separate pages and color keyed. Page numbering system is designed to accommodate new catalog sheets in order of sequence as they become available. A panel area calculator supplements the catalog (16 pp.)

AIA FILE NO. 31-F-2

MFR: K-S-H PLASTICS, INC.

Circle 328

Circle 126 for further information about ANACONDA→

ARCHITECT: Philip Johnson. INTERIORS: Philip Johnson assisted by William Pahlmann. SCULPTOR: Richard Lippold. ARCHITECTURAL METALS FABRICATOR: General Bronze Corporation.

THE FOUR SEASONS

Distinguished new restaurant in Seagram Building uses rich warmth of bronze for highlights of elegance

Besides helping to create an atmosphere of elegance and warmth, the bronze work in The Four Seasons bears a definite relationship to the distinctive architecture of the building in which it is located. Bronze dividers, of substantial dimensions, in the window-walls serve to repeat the vertical shadow lines incorporated in the exterior curtain-wall construction. Narrow panels of bronze, statuary finish, cover the supporting columns. Sculptural constructions of multiple, bright finished bronze rods, ¼" square, suspended from the ceiling are representations in miniature of the many extruded bronze mullions of the building's exterior. Double rows of slender bronze rods are used in the balustrade for the staircases.

Copper and copper alloys offer a range of enduring colors, forms and textures not available in any other family of metals, and thus provide the architectural designer with unlimited design possibilities. Our book, "Architectural Metals by Anaconda," contains 64 pages of useful information and data on the processing, fabrication, installation and maintenance of copper, brass, bronze and nickel silver. For a complimentary copy write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 6021

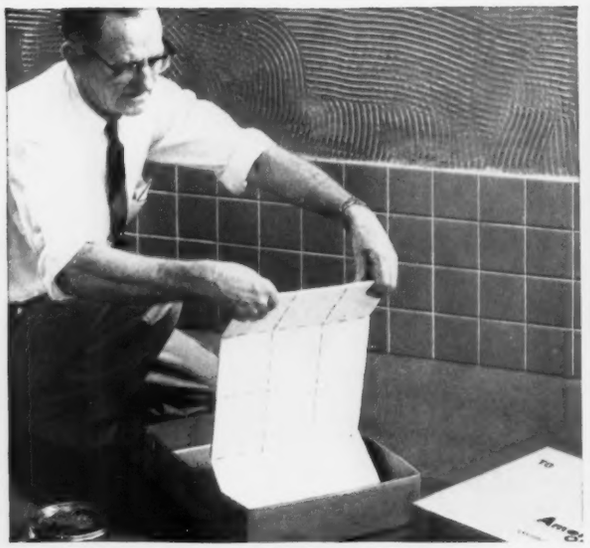
BRONZE—The Architectural Metal of Distinction

ANACONDA®

ARCHITECTURAL METALS

Made by The American Brass Company

New American Olean Mounted Tile cuts wall and floor installation costs



With Master-Set, as many as twelve 4¼" tiles are set as a unit, covering 1½ sq. ft. at a time.

Better handling quality is one reason why Perma-Bak cuts costs. Sheets install quickly, easily; individual tiles can't shift.

MASTER-SET®

FOR GLAZED WALL TILE

Master-Set mounted tile assures faster, more economical installation, especially for large wall areas . . . offers important advantages over other setting methods:

- Special paper-thin mounting sheet provides 75% exposed area for maximum bonding.
- Holds tiles firmly with no sagging, fits snugly, follows wall contours.
- Assures uniform joints with no trowel adjustment, thanks to accurate size control.
- Sheets installed without soaking, using adhesive or dry-curing mortar.

Now available in all standard glazed tile sizes, in bright, matte and crystalline glazes and in some Scored Designs.

PERMA-BAK®

FOR CERAMIC MOSAICS

Perma-Bak mesh-mounted tile provides substantial time and labor savings—especially in large area installations. It also offers other points of superiority over conventional mountings:

- Goes up fast and clean—no paper or paste to remove. Adhesive doesn't bleed through joints. Grouting is easier.
- Goes up smooth—when set with adhesives, it cushions underbed irregularities, gives smoother surfaces.
- Goes up right—pattern is visible all the time, chances of error are reduced.
- Stiffer, tougher mounting sheets travel better to job site, handle better on the job.

Now available in all patterns using full-size sheets in both series of tile sizes: $1\frac{9}{16}$"-$3\frac{1}{4}$" and $2\frac{3}{16}$"-$1\frac{1}{16}$".

Perma-Bak is licensed under U.S. Patent No. 2,887,867

For further information on MASTER-SET and PERMA-BAK, write for descriptive folders.

CERAMIC TILE
American Olean

AMERICAN OLEAN TILE COMPANY • EXECUTIVE OFFICES: 1522 CANNON AVE., LANSDALE, PA. FACTORIES: LANSDALE, PA., OLEAN, N.Y., LEWISPORT, KY.
MEMBER: TILE COUNCIL OF AMERICA, PRODUCERS' COUNCIL • A SUBSIDIARY OF NATIONAL GYPSUM COMPANY

Circle 127 for further information

LITERATURE

DIFFUSED LIGHTING

Complete application and technical data on *Trend Series* luminaires for schools and offices is contained in current bulletin. In addition, photometric charts, dimensional data, ordering information and other descriptive and technical data is provided. Luminaires are described as moderately priced, with attractive, completely luminous wrap-around side panels. The design is stated to provide comfortable, high-level illumination. Models for two, three, or four 430-ma rapid-start lamps are available, with choice of three diffusers. Also shown on bulletin is chart depicting visual comfort of luminaire in accordance with "scissor curve" method recommended by Illuminating Engineering Society. (2 pp.)

AIA FILE NO. 31-F-2

MFR: LIGHTING PRODUCTS, INC.

Circle 329

FURNITURE/STORAGE

SCHOOL LAB FURNITURE

Current brochure describes and illustrates expanded line of stock science furniture. Line is available from stock for shipment within 30 days in No. 156 natural oak finish only. Desired modifications must be made at time of installation. Items available are: instructors' desks; student tables for chemistry, physics, biology, and general science; fume hoods; sink assemblies; aquariums; germinating beds; storage and display cases; etc. In addition to furniture and equipment cataloged, 11 science room floor plan layouts are shown, plus complete roughing-in information on all items in catalog. (48 pp.)

AIA FILE NO. 35-E

MFR: KEWAUNEE TECHNICAL FURNITURE CO.

Circle 330

STORAGE UNITS

Storage for tabulating cards and magnetic tapes is available in wide variety of sizes according to recent brochure. In addition to customary vertical tabulating card file, brochure illustrates and describes mechanized filing equipment and insulated units which protect cards from destruction by fire. Mechanized equipment includes *Kard-Veyor Unit* and *Conve'-Filer Unit*. Also illustrated is variety of available tabulating card filing guides. Several types of magnetic tape storage units including horizontal housing with individual bins which swing outward; two types of magnetic tape truck, one of which also provides housing; and divider type shelving. (12 pp.)

AIA FILE NO. 35-H-42

MFR: REMINGTON RAND DIV., SPERRY RAND CORP.

Circle 331

PLUMBING UNITS

POLYETHYLENE DRAIN SYSTEM

Illustrated brochure describes use of *Vulcathene* integrated drainline system—including pipe, fittings, traps and sinks. In addition, the *Polyfusion* joint is featured. It is a homogeneous joint, with double thickness, permanent and stronger than the pipe itself. Recommended and non-recommended uses are discussed as well as layout, installation and maintenance suggestions. Catalog included. (20 pp.)

AIA FILE NO. 29-B-8

MFR: AMERICAN VULCATHENE DIV., THE NALGE CO., INC.

Circle 332

BRONZE VALVE CATALOG

Catalog 60 covering complete line of bronze valves now available. Items include screw end or sweat end gate valves with "O" ring or conventional packing, renewable disc or standard brass seat screw end globe valves, screw end or copper-to-copper compression stops and valves, and variety of gas cocks, check valves, radiator valves, circulator valves, and balancing elbows. Accompanying dimension charts, diagrams, and roughing-in data provide full details for layout planning and fixture specifying and ordering. (8 pp.)

AIA FILE NO. 29-B-4

MFR: AMERICAN VALVE CO.

Circle 333

STAINLESS STEEL SINKS

Combination price list and illustrated catalog offered, covering *Carlton Custom* and *Carlrim* stainless steel sink lines. Publication pictures six basic sink models, with accessories including drain outlets, bubbles, faucets and siding cutting boards. Intended to be price reference piece for architects and others. (8 pp.)

AIA FILE NO. 29-H-6

MFR: SINK DIV., CARROLLTON MFG. CO.

Circle 334

MISCELLANY

ROAD STABILIZATION

The use of salt for road stabilization is covered in booklet, *Salt for Road Stabilization*. Methods, applications, and advantages of salt stabilization are discussed as well as design and materials, construction procedures, maintenance, and equipment. Case histories and photos of construction methods are included. (24 pp.)

AIA FILE NO. 11

ASSN: SALT INSTITUTE

Circle 335

PLASTICS PRODUCTS CATALOG

Revised and illustrated catalog covers diversified line of plastics products designed for wide range of industrial applications. *Bulletin D400* presents concise data on physical, mechanical, and electrical properties and myriad applications of *Durez* thermosetting phenolic and diallyl phthalate molding compounds. *Durez* phenolic bonding and coating resins, and *Hetron* fire-retardant polyester resins for reinforced plastic laminates and molded shapes. Text is supplemented by photos showing 35 typical product applications; representative materials selection guide encompassing choice of materials, recommended uses, design advantages, and properties. (8 pp.)

AIA FILE NO. 24

MFR: DUREZ PLASTICS DIV., HOOKER CHEMICAL CORP.

Circle 336

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A.W.Faber-Castell Pencil Co., Inc., Newark 3, N. J.

Circle 129 for further information

DOCUMENTS

The documents listed below are available through the associations and agencies cited. All requests should be directed accordingly.

American Concrete Institute, *P. O. Box 4754, Redford Station, Detroit 19, Mich.*

Evaluation of Strength Tests of Concrete, *Bibliography No. 2, 1960. $2.00.*
Lists and annotates selected articles appearing in available technical publications issued from 1924 to 1958 and dealing specifically with compression tests of concrete, variations in test results, and evaluation of tests.

American Standards Assn., *10 E. 40th St., New York 16, N. Y.*

American Standard Large Rivets, *B18.4-1960. $1.50.*
Standard for rivets larger than ½ in. has been brought up-to-date. Includes for first time a table of tolerances for various rivet lengths, designated in proportion to body diameter of the rivet. Covers such rivets as: button head, high button head (acorn), flat-top counter-sunk head, round-top counter sunk head, cone head, and pan head. Tables for each type designate standard diameter of body, diameter of head, height or depth of head, radii of head, or other limiting dimensions, and tolerances for each of these dimensions.

American Standard Installation of Gas Appliances and Gas Piping in Buildings (excluding undiluted liquefied petroleum gas), *Z21.30-1959. $1.50.*
Revised standard is comprehensive with addition of new materials. Standard applies to low pressure gas piping systems. Treats design, fabrication, installation, tests and operations of systems for various types of gases.

American Standard, Cast-Bronze Solder-Joint Drainage Fittings, *B16.23. $2.00.*
This revised standard for cast-bronze solder-joint drainage fittings, designed for use with copper water tube, covers pitch or slope, abbreviations for end connections, sizes and method of designating openings for reducing fittings, marking, minimum requirements for material and dimensions and tolerances.

American Standard Wrought-Steel and Wrought-Iron Pipe, *B36.10-1959. $1.50.*
Latest revised standard includes a simplified format for tables of weights and dimensions. Covers pipe of steel, wrought-iron, carbon-steel and other alloys, both welded and seamless. Tubing is not covered.

American Standard, Preferred Frequencies for Acoustical Measurements, *S1.6-1959. $.35.*
Intended to reduce to a minimum the number of frequencies at which acoustical measurements need to be tabulated. New standard refers all frequency-series to a single reference frequency, and selects others in such a way as to afford a maximum number of frequencies common to the various series. Eleven preferred frequencies cited from 16 to 16,000 cycles per second.

American Standard Specifications for Door and Frame Preparation for Door Locks and Flush Bolts, *A115-1959. $1.50.*
Includes four standards in one set to meet the need for greater standardization in the installation dimensions of hardware for hollow metal doors.

1960 Price List and Index of American Standards. *No Charge.*
A listing of nearly 1,900 standards which have been approved to date. Also listed are the internal standards recommendations of the International Organization for Standardization and the International Electrotechnical Commission.

The National Sanitation Foundation, *School of Public Health, University of Michigan, Ann Arbor, Mich.*

NSF Standard No. 5, Commercial Hot Water Generating Equipment *(Gas Fired and Electrically Heated). 1960. $1.00.*
Covers the design of a hot water heating system, or the selection of hot water generating equipment for commercial dishwashing equipment.

American Society for Testing Materials, *1916 Race St., Philadelphia 3, Pa.*

ASTM Standards on Metallic Coated Iron and Steel Products *A-5. 176 pp., $3.50.*
This second edition is virtually a complete revision of the first edition

issued in 1956. Of the 34 standards, all but five have additional materials or revisions. Among standards covered are zinc-coated wire, strands, fencing, sheets, pipe and hardwire. Also included are aluminum coated wire and aluminum coated iron and steel articles as well as terne-alloy-coated sheets. There are 25 specifications, six methods of test, and three recommended practices.

1959 Supplements to Book of ASTM Standards. *Heavy paper covers; 10 parts. $4.00 per part; $40.00 per set.*

Part 1. Ferrous Metal Specifications, *362 pp. 58 standards.*

Part 2. Non-Ferrous Metals Specifications and Electronic Materials, *280 pp., 38 standards.*

Part 3. Methods of Testing Metals (except chemical analysis), *110 pp., 14 standards.*

Part 4. Cement, Concrete, Mortars, Road Materials, Waterproofing, Soils, *200 pp., 42 standards.*

Part 5. Masonry Products, Ceramics, Thermal Insulation, Acoustical Materials, Sandwich and Building Construction, Fire Tests, *218 pp., 36 standards.*

Part 6. Wood, Paper, Shipping Containers, Adhesives, Cellulose, Leather, Casein, *142 pp., 20 standards.*

Part 7. Petroleum Products, Lubricants, Tank Measurement, Engineer Tests, *428 pp., 43 standards.*

Part 8. Paint, Naval Stores, Aromatic Hydrocarbons, Gaseous Fuels, Engine Antifreezes, *252 pp., 43 standards.*

Part 9. Plastics, Electrical Insulation, Rubber, Carbon Black, *546 pp., 74 standards.*

Part 10. Textiles, Soap, Water, Atmospheric Analysis Wax Polishes, *394 pp., 40 standards.*

National Electrical Manufacturers Assn., *155 E. 44th St., New York 17, N. Y.*

Shunt Capacitors, *CP 1-1960. $.50.* Covers capacitor units ½ kva and larger for power factor improvement and other low-frequency ac applications and assemblies of capacitor units with accessories and control to form complete capacitor installations.

DIGEST:20

NBS RESEARCH ON THE NATURE OF GLASS

To increase knowledge of the properties of glass so that it may be better utilized and find new applications, the National Bureau of Standards carries on a program of fundamental studies of the nature of glass. This program is concerned with the structure and properties of glass, the behavior of glass in unusual engineering applications, and the development of new glasses for special purposes.

Glassmaking has been practiced since ancient times. With the discovery that glass could be blown into any desired shape on the end of a pipe, glass became of commercial interest. Although glassmaking by hand has now given way to automatic mass production techniques, the development of new glasses still remains almost as empirical as it was in ancient times. Only recently have scientifically rigorous studies been made of the structure and properties of glass.

Thus, the fundamental nature of glass structure is still not clearly understood. A number of structural models have been proposed, but none of these models has been completely verified by experimental evidence. Indications are only that there is a short-range orderliness of structure. Not only this problem of structure, but numerous others concerning the properties of glass are under study by many scientists today. With improved understanding of structure should come increased ability to design glasses having specified optical, mechanical, thermal, and chemical properties.

To provide the basic data needed for these studies, the National Bureau of Standards has been conducting a program of fundamental research on the properties and structure of glass and glass-forming systems. This program is concerned with the glass-forming process, the nature of the vitreous and supercooled states, viscosity and surface tension at elevated temperatures, the strength and elastic moduli over a wide range of temperatures, surface properties, and the bulk structure of glass. Other closely related investigations deal with the behavior of glass in unusual engineering applications, the development of special glasses for precision optical instruments, and standard glasses with closely measured physical properties.

Interpretation of glass stability

Fundamental studies of glass-forming regions of simple ternary systems are providing an increased understanding of the nature of glass. For example, analysis of glass stability in terms of phase diagrams has shed additional light on the glass forming process and on the structure of multi-component glasses. This work contributes to present glass theory by indicating that distinct chemical entities exist in glass. Of practical use as well is the related finding that stable glasses are usually found in areas of a phase diagram where the liquidus curve or surface is flat—an indication of a highly dissociated compound.

As stable glass formation is directly opposed to crystallization or devitrification, studies of glass stability include a determination of the factors affecting crystallization. One is the liquidus temperature—the highest temperature at which molten glass and the crystalline phase can coexist in equilibrium; another is the rate of crystal growth at various temperatures; a third is the seeding or nucleation time required for crystal growth to start. A comparison of liquidus data with observed glass-forming ability provides a basis for structural interpretation.

Excess entropy of glass

Studies of the excess entropy of glass should also provide a better understanding of the vitreous state. Excess entropy is a measure of the greater molecular disorder of glass as compared with corresponding crystals of the same composition. Effects are under way to measure this excess entropy in two ways on glasses for which stoichiometrically corresponding crystals also exist. One method is by direct measurements of specific heats over the temperature range from just above the melting point down as near as possible to absolute zero. The entropy loss thereby determined over this range for the glass, as compared with that for the crystal, gives values for the residual entropy. A precision low-temperature adiabatic calorimeter for part of these measurements is nearing completion. It will be supplemented with a high-temperature drop calorimeter. In the second method, vapor pressures are being measured as a function of temperature for substances in vitreous and crystalline states. The entropies of vaporization obtained from these measurements give values for the excess entropy of a particular specimen of glass. Such measurements on vitreous arsenic trioxide have led to interesting side-results indicating an extremely low condensation coefficient.

Glass transition temperature

As a criterion for the transformation between the vitreous and the supercooled liquid states, glass transition temperatures are being investigated. The effect of rate of temperature change on the volume-temperature curve is being measured for experimentally convenient glasses such as nitrate mixtures, selenium, and glucose, which have glass transformation temperatures in the vicinity of room temperature. Variations in rate of temperature change result in variations of transformation temperature of less than 6° C for a given composition. Measurements of glass transformation temperature as a function of composition in two-component systems have suggested that certain systems form glasses only at stoichiometric ratios of the compounds, and a greater number form glasses at nonstoichiometric ratios.

Measured differences in thermal expansion coefficients for glass-forming substances above and below their glass transformation temperatures have been compared with values predicted theoretically from their viscosity-temperature relations. Results indicate that in most glasses, including silicates, the molecular structure may not change drastically with temperature in the transition region. However, in borate and nitrate glasses the thermal expansion

data does not conflict with the concept of structural changes.

Transport phenomena

The study of transport phenomena in vitreous silicates gives important information on both the bulk structure of glass and the structure of the surface domains. As many properties of glass are highly dependent upon the surface condition, this area of investigation promises to yield much information of both theoretical and practical value. Under study at the present time is the migration of mobile ions, such as alkali, through the glass under the influence of a concentration gradient created by subjecting a glass surface to water or other environments containing diffusion sinks for alkali. The experimental study of the diffusion kinetics is performed by a coulometric method that simultaneously determines the amount of alkali released and removes any corrosion products, to maintain a constant pH. The data obtained is compared with mobility data derived from electrical conductivity measurements and analyzed with respect to various theoretical diffusion models. Of further interest are the details of the exchange-mechanism in this process, in particular, how the water constituents enter the structure of the glass. Methods are being developed not only to observe the kinetics of the net-diffusion process but also to obtain successive concentration profiles through the glass at various stages of the diffusion process.

Viscosity and surface tension

One phase of the study on the properties of glass is the development of methods for measuring viscosity and surface tension at temperatures up to 2,000° C. Such data on liquids at high temperatures is useful both for advance of production methods and for progress in fundamental scientific understanding. So far, a room-temperature model of an oscillating cup viscometer has been designed and built. It has been calibrated at this temperature with oils of suitable viscosity. A high-temperature version is now under construction and will soon be completed. The apparent advantage of the oscillating cup viscometer for very high temperature work is that liquids under investigation can be in a totally enclosed container while the rest of the system is in a vacuum. Also, the cup containing the molten material is of a simple geometric shape so that it can be easily fabricated if frequent replacement is necessary. The first material scheduled for study is B_2O_3.

Strength at elevated temperatures

Knowledge of the mechanical properties of glasses at elevated temperatures is necessary for aeronautical applications. The Bureau is measuring the modulus of rupture and the modulus of elasticity from room temperature to a temperature near the softening point of the glass. The study includes the effect of prolonged heating on the strength and on the rate at which samples of both annealed and tempered glass deform under load. Most of the work is being carried on at the Bureau with the close cooperation of several manufacturers.

Only those glasses that are available in commercial quantities, or that have been produced in at least pilot-plant quantities in the form of polished plate, have been chosen for the study. Although the glasses selected for study are few in number they do cover a wide range of physical properties, particularly in respect to coefficient of expansion and strain point. A study of test methods and methods of sample preparation has been completed. Strength tests on six types of glass-soda-lime-silica, two borosilicates, alumino silicate, 96 per cent silica, and fused silica—are almost complete.

Special optical glasses

The increasing use of infra red devices in the fields of target detection, fire control, missile guidance, and aerial reconnaissance creates a demand for improved optical materials for their construction. To develop multi-component glasses having particular infra red transmission properties, the Bureau has been investigating the size, shape, and location of the glass-forming areas in the phase diagrams of simple two and three-component systems. The physical and optical properties of the simple glasses can be correlated with composition to furnish clues to the atomic and molecular units composing the glass structure and their arrangement.

The effects of small amounts of water in the internal structure of glass have been largely neglected in the past. The presence of this water is strongly evident in the infra red spectra of practically all glasses. If glass is to serve as an infra red material at wave lengths beyond 2.75μ, means must be found to eliminate, or reduce, the water content. Work in this area has been in progress for some time. Glasses have been made in silicate, germanate, calcium aluminate, and tellurite systems, and many of their properties determined.

Multi-component glasses based on the $BaO—TiO_2—SiO_2$ system have been made having good infra red transmittance, refractive indices up to 1.94, deformation points above 800° C, and excellent chemical durability. Similar germanate glasses have even higher refractive indices, transmit to somewhat longer wave lengths, deform above 700° C, and also have excellent chemical durability. Calcium aluminate glasses transmit to about 6μ except for a deep absorption band near 2.8μ. They have refractive index values of about 1.67 to 1.70, and deformation points near 750° C. However, they tend to devitrify easily and are attacked by moisture. The glasses based on TeO_2 have high values of refractive index, some of them being above 2.00. They deform at 350 to 400° C and have high coefficients of thermal expansion, which makes them sensitive to thermal shock. The glasses devitrify easily and evidently cannot be cooled in large amounts free of crystalline material. Recently it has been found that the water band absorption is greatly reduced by the use of fluorides as an ingredient of the batches from which the glasses are melted. While the method has been used only on a laboratory scale, it appears to be usable on melts of any size.

Standard sample program

The Bureau has for a number of years made available standard samples of glass to be used as checks on the accuracy of chemical analysis of glass. Two additional types of standard samples are now being considered. One will be a series of glasses, representative of important commercial types, that can be used to calibrate and standardize instruments for measuring the properties of glass. The second will be a series of high purity containing one, two, or three components. These glasses will be used to compare results between laboratories especially in studies of structure and constitution.

A soda-lime-silica glass which is representative of a widely used commercial composition is now being studied for use as a standard of viscosity and surface tension for molten glass. In the lower temperature range up to 1,450° C, a calibrated rotating-cylinder viscometer is used. The surface tension of this glass will also be determined over a similar temperature range. Additional types of glass, representative of those commercially available, will soon be obtained to extend the work on viscosity and surface tension calibrations as soon as the determinations on the soda-lime-silica glass are complete.

DOCUMENTS

(Continued from page 51)

The documents listed below are available through the associations and agencies cited. All orders should be directed accordingly.

Building Research Advisory Board, *National Academy of Sciences, National Research Council, 2101 Constitution Ave., Washington 25, D. C.*

High Temperature Water for Heating and Light Process Loads, *Technical Report 37, No. 753, 1960. $2.00.*

Task group of engineers from the major government construction agencies has prepared design criteria and equipment selection procedures for the application and simplification of high temperature water systems. Criteria for the types of systems, water velocities, hot water generators, methods of pressurization, sizing of expansion vessels, pump design, controls, piping and heat exchange equipment has been developed in detail.

Underfloor Duct Distribution Systems, *Survey of Practice Report 1, No. 755, 1960. $1.00.*

Report presents survey of Federal and private opinions and practices in regard to underfloor duct distribution systems for electrical power, communication and signal services; information relating to allowances for future requirements and trends; and evaluation of generally acceptable types of floor systems which provide the flexibility for satisfying future needs.

Superintendent of Documents, *U. S. Government Printing Office, Washington 25, D. C.*

Temperature Induced Stresses in Solids of Elementary Shape, *by L. H. Adams and R. M. Waxler. National Bureau of Standards Monograph 2, 1960. 27 pp. $.25.*

Presents equations for calculating the stresses in solids of certain shapes when subjected to a sudden change of surface temperature, or a surface temperature that increases or decreases at a constant rate. Tables of certain temperature functions are given as a means of quickly determining stresses in a slab in a a cylinder, or in a sphere subjected to either of two modes of heating. The temperature distribution tables independently will provide a useful means for the ready estimation of temperature gradients.

NAMES

James A. Nolen, Jr., AIA, and Herbert H. Swinburne, AIA, partners in the Philadelphia architectural firm Nolen and Swinburne.

NOLEN & SWINBURNE If there is any one concept that characterizes the thinking of architects James A. Nolen, Jr., AIA, and Herbert H. Swinburne, AIA, of Philadelphia, it is master planning in architecture. Their projects normally encompass building complexes rather than single structures. They point out that even on a relatively small project, like a junior college library recently completed, the development of a complete master plan for the college was a basic consideration.

This youthful and imaginative team of architects has developed a philosophy that explains their fundamental approach in practice: "Architecture is the creation of total environment within which man can accomplish his aspirations."

As graphic illustration to this concept: Nolen and Swinburne are in the process of creating a completely new environment for Philadelphia's Temple University. The present area is characterized by heavy traffic, dense population and excessive land costs. They have studied Temple's critical expansion problems, its students, its faculty, its pattern of activities. As architects they were not interested in buildings just as buildings, but as vehicles to augment the educational process efficiently. They sought in the structures, together with the spaces and courts between them, to create "an atmosphere of active participation rather than scholarly detachment." The master plan which was developed is doing just that.

The firm has been in existence since 1949, with a full partnership having been established in 1955. Nolen and Swinburne refer to the work of the firm as "team practice." With their three associates, they operate within this organizational framework, because in their experience, they have found that the practice of architecture is becoming more complex and that their clients are demanding more service. The high professional standards of the office are further explained by the fact that more than three-fourths of Nolen and Swinburne's architectural staff are registered architects.

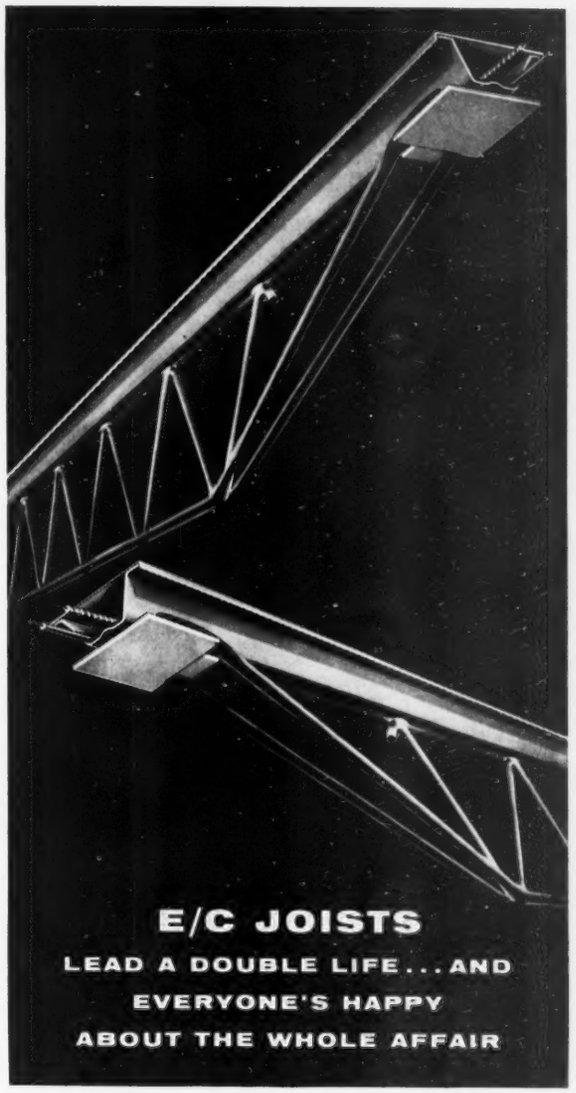
Nolen and Swinburne avoid specialization in any particular building feeling that this would inhibit the nature of the practice. The range of work by the firm has included the design and planning of: elementary, high school and college buildings; hospitals; Temple University Physics building; La Salle College Science Building, medical research building; the Philadelphia Country Club; industrial plants; naval reserve training centers; and many others.

Nolen and Swinburne have developed a unique presentation portfolio called "Planning to Build," which serves as a guide for the client, in helping him to evaluate the business aspects of architecture and anticipate the problems encountered during the critical design and construction stages. The portfolio also emphasizes the office's own particular policy with respect to each phase of work as it advances step-by-step to final completion and acceptance. "Planning to Build" has filled such a need in architectural practice that Nolen and Swinburne have received requests for copies from countries all over the world.

James Nolen is a native Philadelphian and comes from a family of contractors and builders. Therefore, he places special emphasis on costs, methods and sound building in architectural practice. Nolen has four children, the oldest a student at Notre Dame where his father graduated in 1935. He lives in the Chestnut Hill section of Philadelphia, and usually prefers golfing for relaxation.

Herbert Swinburne came to Philadelphia from his home in Nevada to accept a student scholarship at the University of Pennsylvania's School of Architecture, where he graduated in 1934. Completely "sold" on the city, Swinburne says he "wouldn't move from Philadelphia for anybody." In conversation, he emphasizes his fascination with the city's character and charm, his pride of the repertoire of historic buildings and the almost heroic work of local people who are active in preserving them. An active Philadelphian, Swinburne is a member of the Committee on Arts and Sciences of the city's famed Franklin Institute.

In professional organizational affairs, Swinburne is now serving as National Chairman of the AIA Committee on Research for Architecture, which made important contributions to the AIA-National Science Foundation Conference in Ann Arbor, Michigan, 1959. He is also Chapter Chairman of the Professional Program for the 1961 AIA Convention to be held in Philadelphia. Recently he served on a special "task force" for the Governor's Committee on Education of the Commonwealth of Pennsylvania, where he advanced significant ideas in school design and creative educational programming. He lives in Philadelphia, has four children, the oldest attending the U.S. Naval Academy at Annapolis.



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F S T C

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EDITORIAL

INTER-ALIA—Our architectural confusion: In the uneven course of this editor's literary meanderings in the fields of architecture and the allied arts, he reads many, many things: expositions, *rationales*, reminiscences, dissertations, monographs, paragraphs, and a vast host of intellectualized folderol and self-serving twaddle which often serve to justify work of ephemeral character. Indeed, after a while, the brain becomes inured and develops a thick membrane that envelops the gray matter thereby providing a panoply of great internal resistance to the next onslaught of verbiage.

Casting aside our jaundiced eye (the good one, that is) we would like to state that a fresh breeze (from where, no one *here* really knows) wafted into this office carrying with it a little known collection of essays entitled, *Our Architectural Confusion—Essays on Architecture* by Louis LaBeaume, FAIA, of St. Louis. These essays explode and reduce to *absurdum* some of the preciously-held fragments of the all-too prevalent cult of architectural personality. The author, who is from Missouri (in place and outlook), places a few well-aimed shots at the contemporary pre-conceived aesthetic conceits in architecture, scoring a resounding bull's eye or two, and sets the framework of much of our present thought in architectural philosophy into a wholesome, historical perspective. And to his everlasting credit, he conveys his sharp attack with a fine rapier-like thrust of delicious wit and irony.

The author asks, "How did the modern passion for 'functionalism' come upon us? Rising from Germanic and Scandanavian sources, between World Wars I and II, the cult of *efficiency per se* sped across the sea. Its proponents, showing contempt for both precedent and history, also tended to brush aside all considerations of climate, geography, and diplomatic comity in their enthusiasm for what they proudly called 'the international style'.

"As often happens when the masses are confused, opportunists arose to capitalize on public diffidence and lack of understanding. The poor boobs who had hitherto been content to ask, "What *style* is it?" would perhaps now ask, "What the hell *is* it?" Nevertheless, they would be shamed by a superior pose into ultimately accepting it.

"But architecture must be true to life," author LaBeaume continues, "compounded of the very substance and spirit of man's *best* (*Ital. mine—Ed.*) hope. Man's processes of development are nature's processes. They are as dependent on what has preceded them as any contemporary picture or poem or building that must be done on something that other man have done. The so-called modernist is frequently reluctant to admit this—and this failure may account for some of the vagaries and eccentricities which so inflame the conservative.

"After all, it isn't mere whim or affection that leads to change. It is exigency. The exigent demands of modern life are unceasingly at work—shifting patterns, which have come to be regarded as fixed.

"We resist, we hold out as long as we can. We cling to old fetishes as long as we can make them serve—and some serve very well. The new must justify its newness, and will grow old in the process. Meantime, we can only try to be as good-humored as possible."

And this distinguished architect-author is good-humored. His warmth and facile wit infuse this grand little book with the learnings of sixty, fast-moving years of professional life. He deftly analyzes each facet of the arts: new materials, taste, the use of ornament, "museology," the part played by art and architecture in the growth of America's culture.

Conservatively trained in the Beaux Arts tradition, he, nevertheless, has a fine ear and eye to the groundswell of current sights and sounds when discussing both sides of *the* architectural controversy.

These little essays are monumental in their clarity, their pith and brilliance of style. One could wish that more architects would write as eloquently and as freshly as does our worthy colleague. His work is indeed, an oasis in a desert of philistines. This book is published by the Vantage Press, Inc., 120 West 31st Street, New York 1, N.Y. The price of admission to a charming world of civilized expression and brilliant thought is a mere $3.00. Neither Mr. LaBeaume nor the Vantage Press know of this editorial comment. It will come as a complete surprise to them. In fact, we had to "moonlight requisition" our copy (to use an old Army phrase). Accordingly, we are eager to share our unbridled enthusiasm with you—and we know (no matter which side of the aesthetic fence you are on *and* if you can put down that current volume of the *Lawrence Durrell tetralogy* long enough) a pleasant surprise and a rewarding hour of pleasurable wit and informed comment awaits the reader of this series of sardonic, sparkling essays. *JJC*

BOOKS

Antoni Gaudi, Casa Mila, Barcelona 1905-07 Amigos de Gaudi, Barcelona. Photo by MAS, Barcelona.

Art Nouveau—*Art and Design at the Turn of the Century, edited by Peter Selz and Mildred Constantine. New York: The Museum of Modern Art, distributed by Doubleday & Co., Inc., 1960. 192 pp. $6.50.*
The florid and fanciful style of arts and crafts that flourished for just a few years around the turn of the last century, comes under careful examination in the current exhibition at the Museum of Modern Art in New York (with future showings scheduled in Pittsburgh, Los Angeles, and Baltimore). In conjunction with the exhibition, The Museum has published an impressive catalog that exceeds the scope of the exhibition itself and offers a rich source of study. Profusely illustrated, the book includes articles by Greta Daniel, Alan M. Fern, Henry-Russell Hitchcock, and Peter Selz who write on all aspects of the style from book-bindings to the fantastical buildings of Gaudí and Horta. The book is an invaluable document in the study of this exuberant, if brief, era in the history of design. An era, that prepared the foundations of our own contemporary style by a group of artists and craftsmen who tried to break away from the excesses and *fin de siècle* conceits of the Victorian Age. *FPS*

Milli-microsecond Pulse Techniques, *Second Edition, by I. A. D. Lewis and F. H. Wells. New York: Pergamon Press, Inc., 1959. 417 pp., illus. $8.50.*
Describes developments in the theory and design of electronic circuits and devices for operation in that range, somewhere between the area of microsecond pulse circuits and that of microwave devices. Second edition includes new material on transistor type devices capable of high switching speeds and on other topics.

Art and Architecture in Belgium: 1600-1800, *by H. Gerson and E. H. ter Kuile. Baltimore: Penguin Books, 1960. 160 plates, 7 drawings. $12.50.*
Painting, sculpture and architecture are dealt with. Since the emphasis is on painting, the center of attraction is Rubens. The volume starts with the Late Mannerism of about 1600 and ends with Rococo.

Nature and Properties of Engineering Materials *by Zbigniew D. Jastrzebski. New York: John Wiley & Sons, Inc., 1959. 571 pp., illus. $11.00.*
Undergraduate text for engineers aims to present a unified treatment of a variety of materials by stressing those fundamentals which provide a common basis for explaining the behavior of the materials.

Laplace Transforms for Electronic Engineers *by James G. Holbrook. New York: Pergamon Press, Inc., 1959. 259 pp. $8.50.*
Designed primarily as a self-study text for the practicing electronics engineer who has a college background in calculus and in circuit analysis. The book begins with a review of complete variable theory which leads into Laplace transform theory. Symbols and terms are explained simply. Contains numerous worked examples and problems.

Pipefitters Handbook, *Second Edition, by Forrest R. Lindsey. New York: The Industrial Press, 1959. 410 pp. $6.00.*
The second edition, enlarged by 128 pages, retains a handy pocket-size format, large type, and general arrangement. Besides extension of the range of data for a number of operations, the second edition differs from its predecessor by an addition of a subject index and a chapter on plastic pipe.

Transformers for the Electric Industry *by Richard L. Bean and others. New York: McGraw-Hill Book Co., Inc., 1959. 409 pp., illus. $12.50.*
An introductory text written for the engineer in the electric power industry who is not a transformer specialist but who wants comprehensive knowledge of transformers.

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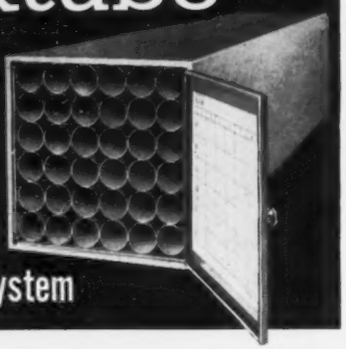

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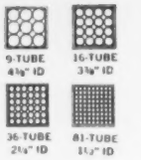

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26-29 AMERICAN WELDING SOCIETY: national fall meeting, (three sessions sponsored by American Society of Civil Engineers). Hotel Penn-Sheraton, Pittsburgh, Pa.

26-30 AMERICAN INSTITUTE OF ARCHITECTS: board of directors meeting, Las Vegas, Nev.

27-30 PRESTRESSED CONCRETE INSTITUTE: annual convention, Statler-Hilton Hotel, New York City.

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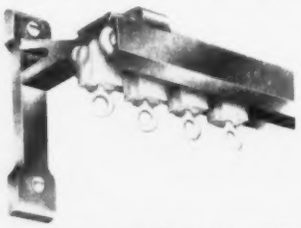

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